

# THE IRON AGE

New York, December 9, 1915

ESTABLISHED 1855

VOL. 96: No. 24

## Stock Keeping in Adding Machine Factory

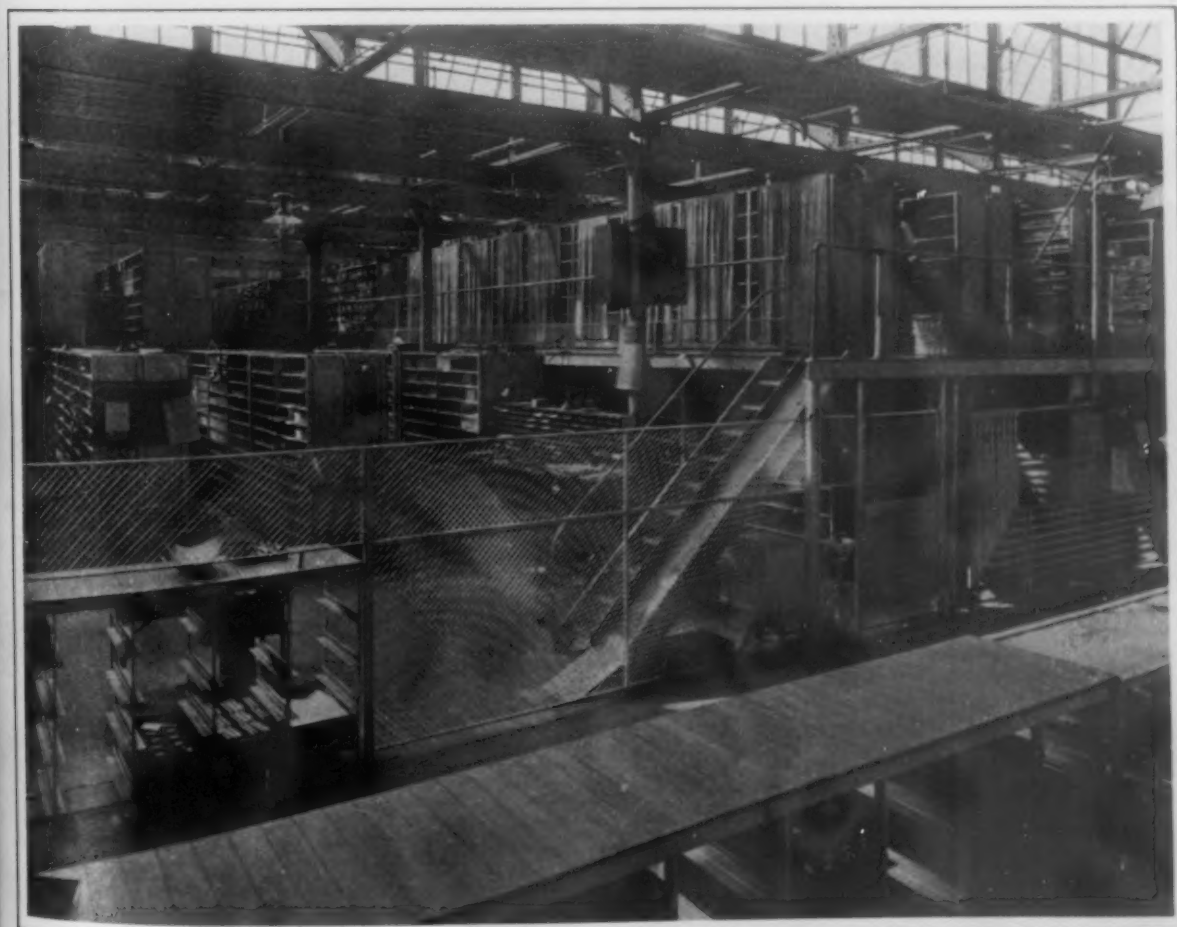
Routing System of the Burroughs Adding Machine Company—Perpetual Inventory Provided—Convenient Stockroom Arrangements

BY F. L. PRENTISS

Efficiency in plant management requires a practical system for keeping track of the amount of stock on hand and what is going through the shop in the manufacturing and assembling processes and convenient storeroom facilities for handling stock so that it can be sent to the proper department when required without delays. Stock handling methods are usually worked out to meet the needs of individual plants and necessarily vary materially according to the line of products. In plants making a large number of small parts the stock-keeping arrangements are of more importance and require a

more intricate system than is needed in a shop where the parts are made comparatively few.

The stock-handling and routing methods and the finished stockroom of the Burroughs Adding Machine Company, Detroit, Mich., are of unusual interest, because this company's products require the manufacture of a very large number of parts, and because of the very complete, but not intricate, system that has been devised for issuing parts to departments, routing, keeping track of parts in the plant and storeroom arrangements. The company makes and keeps in stock approximately 10,000 dif-



Finished Stockroom Showing Arrangement of the Racks, Chutes for Taking Boxes of Stock Material to and from the Balcony and at the Left Racks along the Partition for Holding Stock Going from and to the Finished Stockroom

ferent parts, including subassembled parts and different sections for each class of machines. The ordering, tracing and storing of these parts come under the supervision of the factory order department. A production schedule furnished this department every three months is the basis for determining the ordering of parts. All parts are known by symbol numbers. Assembled parts are designated by dash symbols.

The large number of different parts required indicates that a great deal of detail work is necessary in keeping track of the stock, no matter how simple the system may be. With the system employed and blanks used, a perpetual inventory is provided and a complete record is kept almost up to the minute of the progress of the work through the factory. This record shows the number of each part in the finished stockroom and the number of

DEPT.		OPERATIONS		STRAIGHT SYMBOL ORDER RECORD											
23	35	flash		Name of Part				Handle				SYMBOL NO. 368 <sup>a</sup>			
23	53	on sand 15 hrs		Raw Material				Forging				CONST. STY. PCE. CONST. STY. PCE. CONST. STY.			
15	15			Length				Pcs. per Fl. Bar				100 200 800			
15	70-76			No. per Tray				Time per Piece							
4	26-79			No. per Box				250							
4	20	to size 352 <sup>a</sup> end		LOT NO.				DATE				AMT. ORDERED			
15	15			1				10/6/15				1000			
5	47	for 362		2											
3	381														
				LOT NO. 1											
				SYMBOL 368 <sup>a</sup>											
				DATE OF ORDER 10-6-15											
				STARTS IN 30											
				DEPARTMENT											
				QUANTITY											
				DESCRIPTION OF MATERIAL OR PARTS USED											
				FORGING											
				DO NOT WRITE IN THIS SPACE											
				NUMBER PARTS WANTED 1000											
				NUMBER PER BOX 250											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											
				PARTS S. S.											
				DATE DUE											
				ORDER ISSUED BY											
				DEPT. OPERATIONS											
				23 35 flash											
				23 53 on sand 15 hrs											
				15 15											
				15 70-76											
				4 26-79 to size 352 <sup>a</sup> end											
				LOT NO.											
				DATE											
				QUANTITY PARTS DELIVERED											
				AMT. ORDERED											

BURROUGHS ADDING MACHINE CO.

NOTIFICATION TICKET

ORIGINAL

DATE 10/6 1915

TO DEPARTMENT 3

THE FOLLOWING STOCK IS NOW READY FOR YOUR DEPARTMENT

FOR FURTHER OPERATIONS

SYMBOL & LOT NUMBER	OPERATION	QUANTITY	BOX NUMBER
1-7990	383	960	6853
2-10			
		23/30.	
19			

ISSUED BY DEPARTMENT 16

FORM 244

FOREMAN K.

S. S. CO.

Notification Ticket Sent to the Order Department to Give Information Regarding the Progress of the Work from One Department to Another in the Factory. These Tickets Are Collected Every Hour and the Data Transferred to the Tracer Sheet Shown on the Preceding Page. All Tracing of Stock Is Done by the Inventory Clerks Using the Tracer Sheet

parts that are in the various manufacturing departments. This eliminates stock tracing in the plant, all tracing of stock being done in the office.

Work goes through the factory in sheet metal boxes, and for convenience all pans are numbered. The stock order and the manufacturing departments are kept in close touch by a report of the daily meeting of the inventory clerks and a representative from each of the production and inspection departments, when matters relating to stock and production are discussed.

In carrying out the details of the system a number of forms are used, and the first that may be referred to in the natural order is the straight symbol order record or master order card. This card, which is kept on file in the stock order department, shows the name of the part, the symbol number by which it is designated, the raw material to be ordered from the raw stockroom, the department to which the work is to go, the operations to be performed, the departments and operations being designated by numbers, the number of lots ordered and the number of pieces in a box or pan. In specifying the amount of stock required, the length of raw stock is given, the stock usually being in 6, 10 and 12 ft. lengths. The date the lot is finished is stamped on the master symbol card.

When parts orders are issued, the master card is passed on to the order clerks, who make out the shop order cards, which are essentially a copy of

the master card with all the details pertaining to the quantity of parts to be made. At the same time a tracer sheet, order for stock and cost record are made out by the use of carbon paper. These shop order cards go into the various departments with the work in the order indicated on the cards themselves, and the progress of the work through the factory is indicated to the order department by the use of notification slips from each department, which inform the order department that the work is going from one department to another. A record is kept of this progress on the tracer sheet, so that at all times the location and condition of all work in the factory is known. This information practically eliminates the necessity of stock tracing in the plant, all tracing of stock being done by inventory clerks by the tracer sheet and notification tickets received hourly.

In case it is desired to have part of an order finished quicker than it would be in the regular routing, part of the order is sent through the shop ahead, and notation of this fact is made on the order card. In case of a rush order, a stock order card having a red top is made out. These rush orders are given a preference over all other work in the departments that the rush work reaches in its routing. When an order is completed, it is inspected,

FINISHED STOCK REQUISITION

DATE 10-7-15

DEPT. NO. 37

SYMBOL ORDER NO. ACCT

SYMBOL NO.	WHEEL STYLE	AMT WANTED	AMT DELIV	O. K.	REPT LEFT
1-368 A	9	100	100	✓	

FILLED BY

DATE

ORDERED BY

REQUISITION FOR STOCK ORDER

DATE 11-6-15

SYM. NO. 1-368 A

QUANTITY ORDERED 1000

STYLE

LOT NO. 1

CONSISTS OF	NO. PER BOX	BOX NO.

DUE DATE 191

ISSUED BY J. H.

Requisition on Finished Stockroom for Material Required by Any Department and the Stock Order Issued by the Inventory Clerk to the Factory when It Is Desired to Replenish Finished Stock of a Certain Part

STRAIGHT SYMBOL 368<sup>a</sup>

HIGH MARK

ENTERS DASH 1-368<sup>a</sup>

LOW MARK

ONLY USED IN FOLLOWING STYLES AND CONSTRUCTIONS

NO.	SYMBOL	QUANTITY	RECEIVED	BALANCE	DELIVERED	ONE SET IN STOCK
1	368	1000				
2						
3						
4						
5						
6						
7						
8						
9						
10						

INVENTORY CARD FOR A SINGLE PIECE GIVING THE SYMBOL NUMBER, THE ASSEMBLED SECTION IT FORMS A PART OF AND THE DATA NECESSARY TO GIVE A RECORD OF MATERIAL ON HAND AT ANY TIME

receipted for and the date stamped on the shop order card by the inspection department. The card then goes to the finished stockroom, where the number of pieces received is written in and the date is again stamped. The stock order card is used both for single pieces and for the assembled sections.

When any department requires parts from the finished stockroom, it issues a finished stock requisition which bears the date, the department number, the symbol number, the number wanted and a space on which to indicate the number delivered. When stock is taken from the finished stockroom on a requisition, the proper entries are made on inven-



TOOL RECORD		OPERATION AND TOOL RECORD				
PROD. OFFICE						
DEPT. ST.						
ST.						
S.						
PART DRAWING DATE		FOR DASH		SYMBOL		
SHEET WRITTEN				STYLE		
DEPT. NO.	SEQ. NO.	NUMBER	OPERATION DESCRIPTION	ORDER NO.	SEQ. NO.	TOOL

Operation and Tool Record Prepared by the Production Department When an Entirely New Part Is to be Made, Giving a Description of the Part and Specifying the Machines and Operations Entering into Its Production

tory cards, of which there are two, one for single parts and the other for dash parts or small assembled sections. The record kept on these two cards forms a perpetual inventory. The inventory card illustrated is for single pieces and shows the symbol number of the piece, the number of the dash of which it is to form a part, the date, lot number, number of pieces ordered and delivered and the balance in stock, after a certain number of parts are received or delivered out of stock. The dash part inventory card is similar to the above, except that space is provided on the form for entering the symbol numbers of all the pieces that are used in the assembly and the number of each piece required. Opposite the words "High Mark" and "Low Mark" space is provided for entering the maximum and minimum number of pieces to be kept in stock. These restrictions apply to small parts that are common to most classes of machines. The inventory card always shows with close accuracy the number of each part or symbol in stock, some variations, however, being due to the fact that the number is determined by scale count.

When it is desired to replenish finished stock of a certain dash part, a requisition for stock order is issued by the inventory clerk giving the symbol and lot number and number of dash parts to be

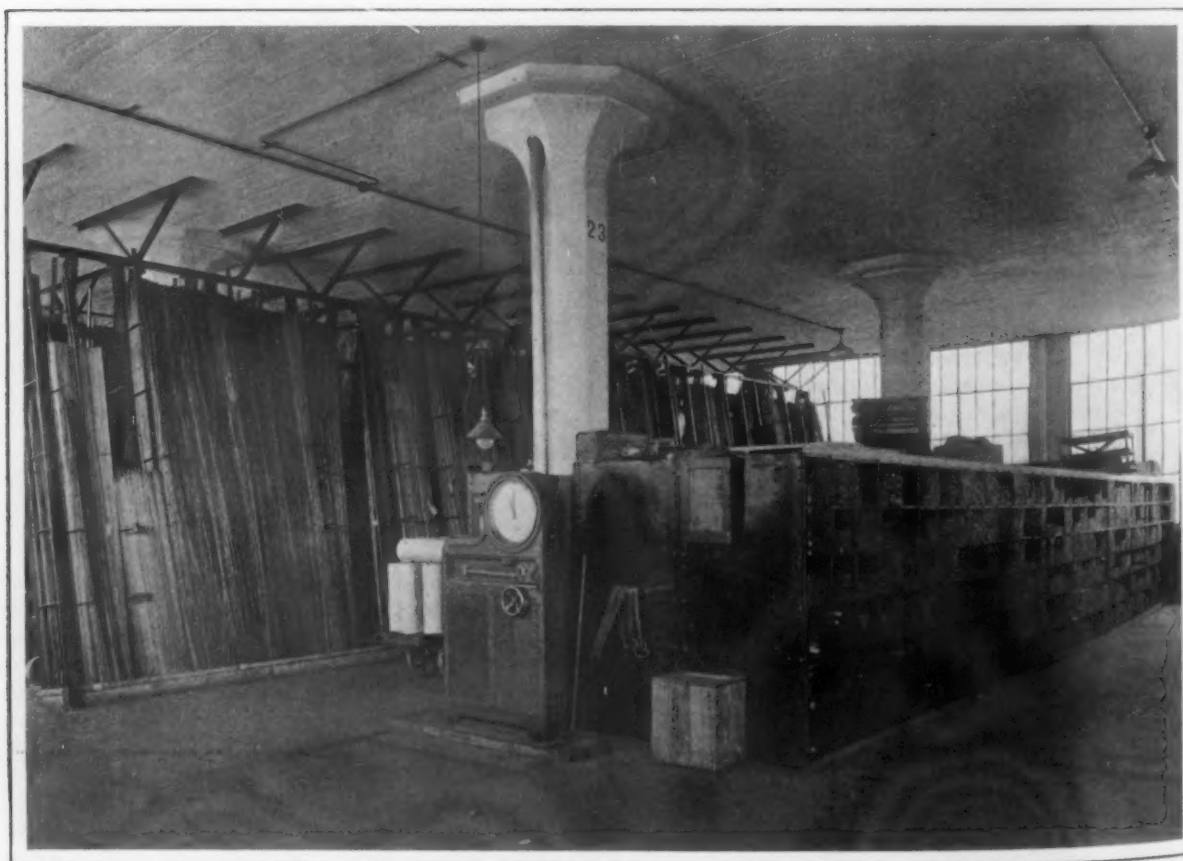
ordered. This requisition is used in connection with a master dash operation card, a form giving the dash number and list of parts required and the operations and routing.

It will be noticed by reference to some of the blanks that the work in going through the shop is divided up in lots bearing lot numbers. In this way the cost department has an opportunity to figure the cost on each lot and to compare the cost of one lot with that of a similar lot made at a previous time.

Each day a preferred stock list is issued. A copy of this goes to each department, and the department foreman looks it over to see if there is any work on the list for his department. If so, this is given preference over other work.

When an entirely new part is to be made, the production office and tool designing department prepares an operation and tool record, this sheet containing a description of the part and also one of the operations and specifying the tool to be used, and this becomes a permanent record for that part.

The stockroom at one side of the main manufacturing department, from which it is separated by an aisle and wire netting partition, is of metal construction throughout, and arranged for convenience both in storing a large number of parts and



The Angle-Iron Rack in the Raw Stockroom for Storing Long Pieces Which Are Kept from Spreading by a Concrete Shoe Built Up from the Floor



in delivering those parts throughout the plant when wanted for manufacturing and assembling purposes. It is a two-story room, the upper floor or balcony being built of iron gratings. The balcony is used largely for the storing of lighter parts or finished sections, as they are bulkier and lighter than the single pieces. Standard racks are used for storage purposes, each 8 ft. high, 8 ft. long and 4 ft. deep, each rack being divided into two 4-ft. sections. The racks are very strongly constructed of No. 18 gage sheet steel with channel iron rods and flats in the partitions, and each shelf is supported by three bolts. The racks used for shafts are made to stand an extra heavy load by having a reinforcement of pipe along the outer edge.

All the racks are shelf racks so that they can be used for the storage of either loose parts, assembled sections or pans. Between the racks are 4½-ft. aisles, and electric lamps reach down from the ceiling to the top of the racks in the center of each aisle. Parts are placed in the racks according to

record is kept up to the minute, the stock keeper can tell at a glance the condition of his stock.

In the raw stockroom the angle-iron rack for stock in long lengths that is kept in a vertical position is supported at the top with braces attached to the ceiling, and at the bottom of this rack on each side a concrete shoe is built up from the floor to prevent the stock from spreading. Stock is stored on each side of this rack. The construction features are made clear in the illustration of the raw stockroom.

### Cast Vanadium Steel Dies

The use of alloy steel castings for dies has lately come into prominence due to important developments which have been made in the last few years by steel foundries specializing in such material. Cast steel dies are now being used by drop forging manufacturers, by plow manufacturers for making plowshares, and by sheet metal workers for forming dies in the production of sheet metal



At the Left, Pattern for Cast Steel Die for Drop Forge Work. The Impressions for the Breakdown Are Cast to Shape. While the Forming Die Is Sunk in the Flat Surface. At the Right Is the Back View of a Cast Steel Die for Making Plowshares, Showing the Tenon Cast on the Die. In the Middle Is a Pair of Cast Steel Dies for Making Plowshares. The Dies Are Cast as Shown

symbol numbers that run in regular order, and this arrangement brings parts of a similar character together. For example, one section or aisle is used exclusively for shafts, another for screws, nuts and pins and another for special parts. Stock for repair parts is kept in a separate stockroom. A few of these racks are inclosed, and some are covered with curtains to keep out the dust. When stock is stored in pans, it is kept in the same pans that carry the work through the shop. Part of these pans are 13½ in. wide, 23½ in. deep and 9½ in. high, and the remainder are the same width and height but twice the depth.

A unique and convenient method is used for taking material to and from the balcony of the stockroom. At the side of the stairs, as shown in the illustration, is a chute. Instead of carrying a pan of stock down these stairs, a man at the top lets it slide down the chute, and it is caught by a man at the bottom, or the man above walks down the stairs holding on to the pan in the chute with a hook as he descends. In the same way a hook is used to pull the pan of stock up the chute to the balcony. A convenient method is used for taking pans of stock to the stockroom without requiring a workman to enter the enclosure. When a pan of stock is to be taken to the room, the workman places it in one of the racks built in the partition and shown at the left in the illustration, and the stock keeper pulls the pan out from the rack on the other side.

The stock keeper has a blackboard adjoining his desk on which he enters all stock shortages of parts or assemblies that may be holding up orders in the different departments. Entries are made on this blackboard as changes occur, and as the blackboard

specialties, kitchen-ware, etc. Various alloys have been tried for cast steel dies, but, according to C. R. Messinger, vice-president Sivyer Steel Casting Company, Milwaukee, the most satisfactory material so far introduced is vanadium carbon steel.

The Sivyer Company has made a specialty of cast vanadium carbon dies under the name of Sivyer die steel. Exceptional wearing qualities are reported, together with unusual resistance to cracking or breaking under the battering to which dies are subjected. For example, a run of 40,000 automobile brake support forgings 20 in. long, was made from a pair of Sivyer dies without, it is stated, any great amount of wear. In another instance a plow manufacturer claims that his dies last at least six times longer than cast-iron dies for forming plowshares, and are considerably cheaper than hammered blocks.

For general drop forge work the company considers the best practice is to cast the dies with the tenons and with the impressions for breakdowns approximately to shape, allowing a small amount for finish. The impression for the die is then sunk in the solid block. For plain forgings, the impressions also are sometimes cast in the dies allowing some metal for finish. In dies for making plowshares the entire impressions are cast in the dies, allowing about ¼-in. metal for finishing. Forming dies for sheet metal are also cast approximately to shape with some allowance for finishing.

After annealing and machining the general practice with cast vanadium dies is to heat to 1500 or 1550 deg. Fahr. and quench in oil for a fairly hard surface and in salt water for a hard surface. In most cases no additional heat treatment is required; that is, the temper should not be drawn.

Cast vanadium dies, it is explained, generally cost a little more per pound than hammered carbon blocks. However, it is held that the saving in material from casting approximately to shape more

than counterbalances this and in addition there is less material to be removed.

The reproduced photographs illustrate the best methods of preparing patterns for cast steel dies.

## President's Proposed Tax on Iron and Steel

Twenty-five Cents a Ton on Pig Iron and  
the Same on "Fabricated" Iron and Steel  
—Munitions Tax Apparently Constitutional

WASHINGTON, D. C., Dec. 7, 1915.—President Wilson's recommendation for the raising of additional revenue to meet the deficit in the treasury and to cover the cost of the national defense program are not only surprising to the iron and steel industry, but in their entirety have dismayed many Democratic Senators and Representatives, who realize how unpopular some of the suggestions will be in the agricultural regions, which are the chief hope of the majority party in Congress, because of the high prices which the farmers' products have obtained since the beginning of the war. The suggestions in the message, however, will greatly encourage the movement set on foot some time ago for a tax on war material and there is likely to be much competition among Senators and Representatives, each anxious to be known as the originator of any war munition tax measure that may be adopted.

The suggestion of the President that all the money needed by the Government in excess of current revenues can be derived by reducing the exemptions and increasing the rates of the individual income tax is likely to receive very respectful attention as affording a method of securing the necessary funds without taking up other propositions of doubtful expediency and popularity. It is improbable, however, that the income taxes will be increased sufficiently to close the gap between prospective receipts and expenditures, hence the President's alternative recommendations are of great importance, especially as Senators and Representatives may decide that it will be safer politically to "support the President" than to put forward original propositions, which, should they prove unpopular among the voters, could not be laid at the door of the "captain of the team," as the President is fond of describing himself. These alternative suggestions include taxes of 1c. per gallon on gasoline and naphtha, 50c. per horsepower on automobiles and internal explosion engines, a stamp tax of 2c. on bank checks and a tax of 25c. per ton on pig iron and of 25c. per ton on "fabricated" iron and steel.

### THE PIG IRON AND "FABRICATED" STEEL TAX

The proposition to impose a tax of 25c. per ton on pig iron and an additional tax of 25c. per ton on "fabricated" iron and steel, which presumably (in view of waste in manufacturing) would represent a tax of over 50c. per ton on much of the output classified as "fabricated"—whatever that may mean—is entirely novel and is believed to have originated with the President. It was not suggested in Secretary McAdoo's comprehensive statement issued a week ago and if the item has been in contemplation for any length of time that fact has been carefully concealed. Just what the President means by "fabricated" iron and steel is not clear. Obviously, he does not use the term in the technical sense in which it is used in the industry as applied to structural material cut to specifications and punched and fitted for assembling. It may be assumed that he refers to all iron and steel manufactures, but if so it would be interesting to know whether "fabricated iron and steel" would include for taxing purposes only finished products ready for final consumption or such intermediate forms as billets, rods, etc., which, while the finished product of one mill are

but the raw material of another, as well as bars, sheets, plates, etc., which are the raw material of so many industries. The obvious unfairness of imposing a flat specific tax per ton on manufactures of iron and steel which range in value from a few dollars, in the case of billets and bars, up to hundreds of thousands in the case of finished watch springs, is likely to result in the adoption of some other basis of tax if a serious attempt is made to follow out the President's suggestion.

### MUNITIONS TAX ADVOCATES ENCOURAGED

That the advocates of a tax on war munitions will be greatly encouraged by the President's suggestions for levies on iron and steel goes without saying. Already this project has made very substantial progress and is receiving the attention of influential members of both houses, not to mention half a score of newly elected Representatives who hope to attract public attention to their work at the very outset by proposing to turn into the Government's coffers a generous portion of the widely advertised profits of the munitions makers. Senator Walsh of Montana, a prominent member of the Senate Judiciary Committee and a man of unquestioned legal attainments, is making an exhaustive study of the subject and, as stated in this correspondence last week, hopes to devise a method of imposing a munitions tax that will not run counter to the prohibition of the Constitution against taxes on exports. Senator Walsh has decided that nearly all the propositions heretofore suggested are unconstitutional for the reason that they either provide specifically for a levy upon war material upon its exportation, or for a tax on production which will be remitted in the event that the goods are consumed in the United States. This latter proposition is designed to lift the tax on all munitions manufactured for the United States Government, but, in the opinion of Senator Walsh and other legal authorities, the exemption would prove fatal as it would render the tax collectible only on exported products, which the United States Supreme Court has declared to be unconstitutional.

### WAR MATERIAL TAX CONSTITUTIONAL

That a tax on all war material, whether for exportation or for the use of the United States Government, would be constitutional is believed by those who have given much attention to the subject to have been finally determined by the United States Supreme Court in the case of *Cornell vs. Coyne*, 192 U. S. 418. In this case a manufacturer of filled cheese, which was subjected by law to an internal revenue tax, brought an action against a collector of internal revenue to recover the amount of such tax paid on certain quantities of his product which were exported, on the ground that any tax levied upon articles exported was repugnant to Section 9, Article 1 of the Constitution, which provides that "no tax or duty shall be laid on articles exported from any State." The court in deciding this case against the manufacturer quotes the constitutional provision referred to and then lays down the following doctrine.

But this means that no burden shall be placed on exportation, and does not require that any bounty be given therefor. Congress has power to encourage exportation by remitting

taxes on goods manufactured at home as it has power to encourage manufactures by duties on imports, yet the Constitution does not compel it to do either the one or the other. This power of encouraging is illustrated by section 11 of this act, which requires all imported filled cheese to pay, in addition to import duties, an internal-revenue tax of 8c. a pound—eight times as much as that manufactured at home. To remit on articles exported the tax which is cast upon other like articles consumed at home, while perhaps not technically a bounty on exportation, has some of the elements thereof. By this act all filled cheese is subject to a manufacturing tax of 1c. a pound. To remit that tax in favor of filled cheese exported may encourage the manufacturer to seek a foreign rather than a home market; but if the full tax on all filled cheese manufactured is required for the support of the Government, the remission of part necessitates revenue from some other source. Doubtless the remission is given in hope of widening the market and increasing the production, but that is only a possibility of the future, while the loss in the revenue is a fact of the present. Subjecting filled cheese manufactured for the purpose of export to the same tax as all other filled cheese is casting no tax or duty on articles exported, but is only a tax or duty on the manufacturing of articles in order to prepare them for export.

While that which is asked in this case is the return of a manufacturing tax there is nothing in the constitutional provision to distinguish between a manufacturing and other taxes, and if the plaintiff's contention be sustained as to a manufacturing tax it would follow that the Government was bound to refund all prior taxes imposed on articles exported. A farmer may raise cattle with the purpose of exportation, and in fact export them. Can it be that he is entitled to a return of all property taxes which have been cast upon those cattle? The true construction of the constitutional provision is that no burden by way of tax or duty can be cast upon the exportation of articles, and does not mean that articles exported are relieved from the prior ordinary burdens of taxation which rest upon all property similarly situated. The exemption attaches to the export and not to the article before its exportation.

It would seem to be clear from this elucidation of the constitutional prohibition against export taxes that, if similar articles when consumed in this country are subjected to the same tax, there can be no constitutional objection to a tax on munitions when exported. There is reason to believe, however, that there are obstacles much more formidable than legal technicalities in the way of imposing taxes on war materials. The investigation of the subject made by the internal revenue authorities has developed a hundred and one practical difficulties and it is the belief of the experts that a large part of any tax not confiscatory in its dimensions would be eaten up by the cost of collection. In the case of many establishments it would be absolutely impossible to differentiate war material from other products and, even where there was a clean line of demarcation, it would be exceedingly difficult to determine the proportion of profit derived respectively from munitions and other material. Such a statute as is proposed could hardly be less complicated than the income tax law, which the courts have just begun to construe, although in force for more than two years, and it is probable that the execution of the law would involve the compulsory adoption by manufacturers of special systems of bookkeeping, to be devised by the Government, even more elaborate than those now imposed upon the railroads by the Interstate Commerce Commission.

#### FARMERS AGAINST GASOLINE TAX

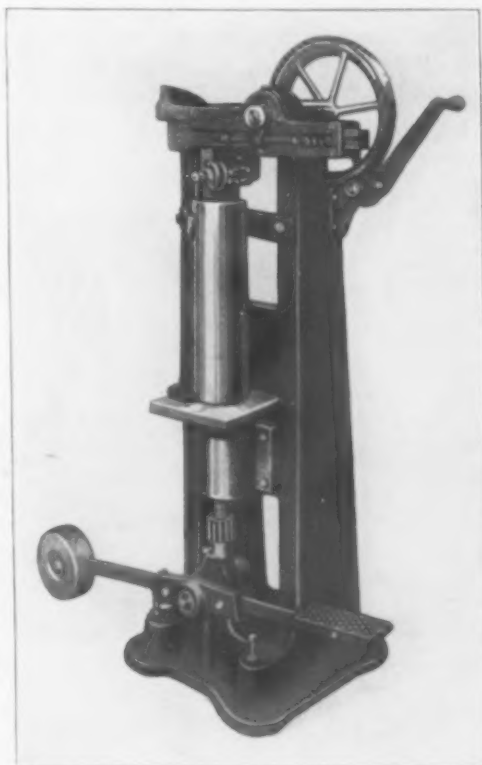
The proposition to tax gasoline has already brought a torrent of protests to Washington from all parts of the country. Manufacturers of automobiles and internal combustion engines have been prompt to take the field on the basis of Secretary McAdoo's announcement, and their protests have been followed up by thousands of complaints from the agricultural regions. Farmers everywhere are writing to their Representatives in Congress describing the burden that would fall upon them should the Secretary's project go through. Every owner of an automobile, no matter how cheap the car, it is asserted, is already required to pay a registration tax and in some cases a personal property tax in addition. A federal tax would about double this burden and an increase of one cent per gallon in the gasoline consumed would in the case of the average automobile user quadruple the load. President

Wilson's proposition to tax the little gas engine of the farmer, through the aid of which some of the most arduous "chores" of the average farm have been in a measure lifted from the human toiler, is likely to arouse a feeling the intensity of which can hardly have been anticipated.

W. L. C.

#### High-Explosive Shell Marking Machine

The Noble & Westbrook Mfg. Company, Hartford, Conn., has recently developed a special marking machine for shrapnel work. It is intended for marking the bases of the shells to conform to the



Machine for Marking the Bases of High-Explosive Shells Up to 6 In. in Diameter and 21½ In. in Length

requirements of the various foreign Government specifications.

The general principle of these machines is the same as that of the builder's Dwight slate marking machine. The roll die, which is specially furnished in each case after a print or sketch of the shell to be marked is received together with the inscription and the number of changes necessary to take care of dates, etc., passes over the base of the shell. The table on which the shell is placed is raised by a foot lever to any desired depth of die which is relied upon to give an accurate impression.

Two sizes of machines are built, the one illustrated taking care of shells 6 in. in diameter and ranging from 12 to 21½ in. in length, while the other machine is designed for shells under 12 in. in length. In the smaller machine a single pull of the hand lever revolves the die and completes the marking of the shell while in the larger machine gears are employed to increase the power and give the desired pressure on the larger shell. In either one of these machines it is possible to mark shells on the base practically as fast as they can be lifted from the floor to the machine table and removed, as the operation of marking requires only from 5 to 10 sec.

The Niles Car & Mfg. Company, Niles, Ohio, will add to its present line of products the manufacture of motor trucks and accessories.



# Coke Ovens Heated From Above

German Tests Showing Influence of  
This Method of Heating—Composition  
of the Gases—Output of By-Products

An article by Prof. Oskar Simmersbach, describing the new Collin ovens at the Radbod mine near Hamm, Germany, at present the largest in the world, and giving the results of some experiments, appears in *Stahl und Eisen*. The tests were carried out to determine the influence of the method of heating used in these ovens, which is an alternation of heating from above and below, on the coking, and particularly on the temperature condi-

nately, through the pipes *d* from each side of the oven at the same time either to the lower distributing flues *e* or the upper flues *e*<sub>1</sub>. The air for combustion comes either from the regenerator *f* to a flue, *h*, under the length of the oven, from which it passes to the vertical combustion flues through the openings *o*, and burns the gas entering at *g*; or else on reversing from *f* to a second flue *h*<sub>1</sub>, parallel to *h*, and by means of narrow vertical flues

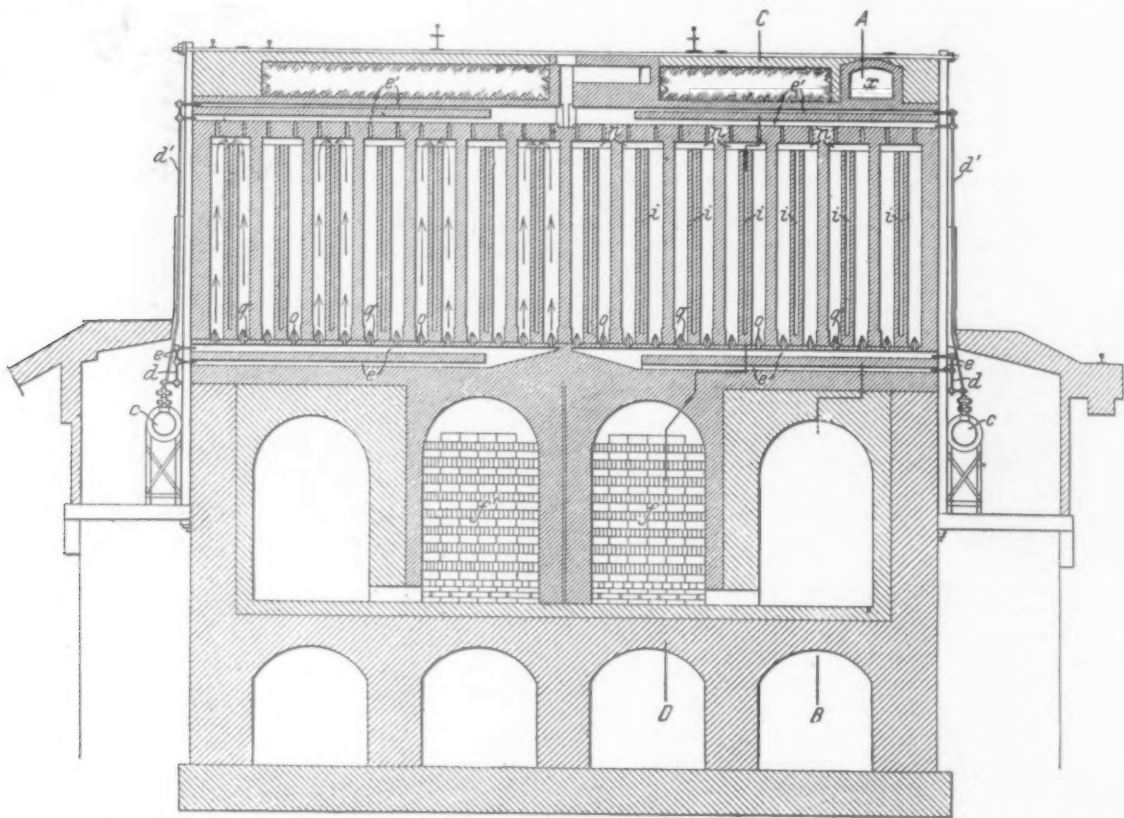


Fig. 1—Cross-Section Through the Flues of a Coke Oven Using the New German Method of Applying the Heat from Above

tions in the space above the charge. Also on the composition of the gases, and in connection with this the output of by-products.

An idea of the heating system is shown in Fig. 1, which gives a section through the flues. The washed gas comes from the condenser house under pressure to the mains *c*; and is introduced, alter-

nately, through the pipes *d* from each side of the oven at the same time either to the lower distributing flues *e* or the upper flues *e*<sub>1</sub>. As mentioned before the ovens are very large, being 3.3 meters (10 ft. 9 15/16 in.) high.

Two tests were carried out, one with the ordinary practice and a 30-hr. coking time, the other with stronger heating and a coking time of 29 hr. The results of the temperature measurements of the first test are shown in Fig. 2. Nos. 1, 2, 3 and 4 were taken in the gas space under the four charging holes. No. 5 was taken in the charge one meter from the bottom under the first charging hole, the one nearest the gas collector. No. 6 was taken in the same position, but under the second charging hole, while No. 7 was taken in the charge 2.2 meters above the bottom under the third charging hole.

The temperature in the space above the charge was very uniform and an average of slightly over 24½ hr. was required before 700 deg. C. was reached, which means that it was only reached at the last part of the coking period. Compared with the Koppers oven, the top temperatures were very low, and the roof much colder. The tempera-

Table 1.—Per Cent of Constituents, by Volume											Lower heating value, B.t.u. per cu. ft.
Test No.	Hours from beginning	CO <sub>2</sub> plus H <sub>2</sub> S	C <sub>2</sub> H <sub>6</sub>	C <sub>2</sub> H <sub>4</sub>	O <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>		
1	0.5	1.55	2.45	3.70	0.20	5.55	48.50	30.90	7.15	720.6	
2	2.5	2.80	1.95	3.45	0.80	5.45	38.80	37.60	9.15	624.5	
3	4.5	3.15	1.70	3.65	0.40	4.20	38.40	41.80	6.70	623.9	
4	6.5	3.10	1.65	3.70	0.35	4.40	36.70	41.05	9.05	602.8	
5	10.5	2.95	1.80	3.05	0.10	5.50	33.40	43.70	9.80	567.2	
6	12.5	2.00	1.50	3.35	0.45	4.55	32.65	46.70	8.80	569.9	
7	14.5	2.90	1.50	2.90	0.95	5.00	30.70	44.80	11.25	540.5	
8	16.5	2.10	1.25	2.90	0.55	4.90	32.55	49.05	6.70	569.9	
9	18.5	1.35	0.95	2.70	0.45	4.75	33.85	51.50	4.45	565.9	
10	20.5	1.00	0.75	2.65	0.50	4.80	32.95	46.05	11.30	533.5	
11	22.5	1.15	0.60	2.60	0.45	4.20	31.25	52.10	7.65	526.2	
12	24.5	1.25	0.30	2.15	0.35	4.75	27.05	60.20	3.95	493.3	
13	26.5	1.10	0.15	2.05	0.10	4.60	28.20	60.40	3.35	497.4	
14	28	1.15	0.10	1.30	0.60	5.35	15.30	63.55	12.65	363.5	
15	29	0.95	....	1.10	0.25	6.80	12.60	62.85	12.45	342.2	
Heating gas mixture		2.70	....	2.60	0.50	5.05	29.10	49.70	10.35	479.4	

ture of the charge does not begin to rise from 100 deg. C. until the fifteenth hour, and rises more quickly in the pusher side because at this side the oven is narrow and heat conduction is better. The highest temperature reached was 1035 deg. C.

The analyses of the gases are given in Table 1. The samples were taken from the flue leading to the collecting main. The results show clearly the good influence of the low top temperatures. The moisture in the coal is completely driven off in the fifteenth hour, which corresponds to sample No. 7. There is immediately a marked decrease in the benzol contents.

With ovens with high top temperatures, the benzol soon disappears completely from the gas, but as Fig. 3 shows in this case it is still found at the twenty-eighth hour, that is, almost to the end of the coking time. The influence of the lower top temperatures is also seen in the case of the methane.

In the second test the temperature of the space above the charge reached 700 deg. C. in 19 hr., and at the end of the coking time was at 785 deg. C. The results and conclusions of the first test were confirmed. In regard to the charge the temperature

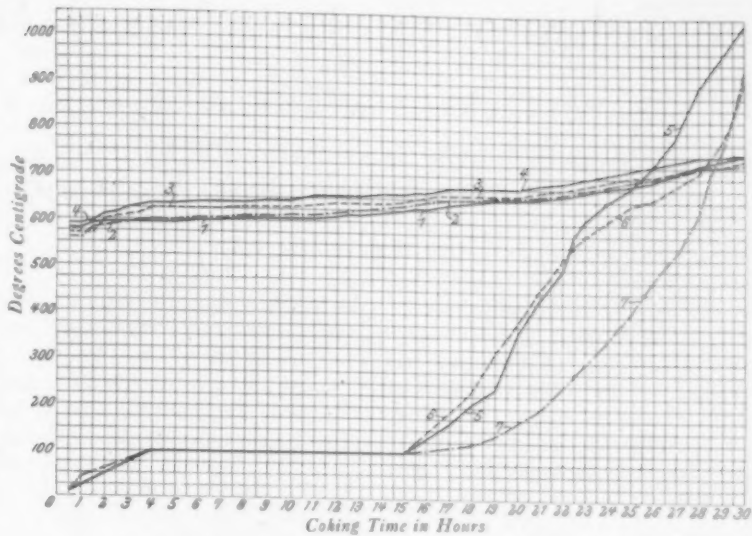


Fig. 2—Temperature Measurements of the First Test

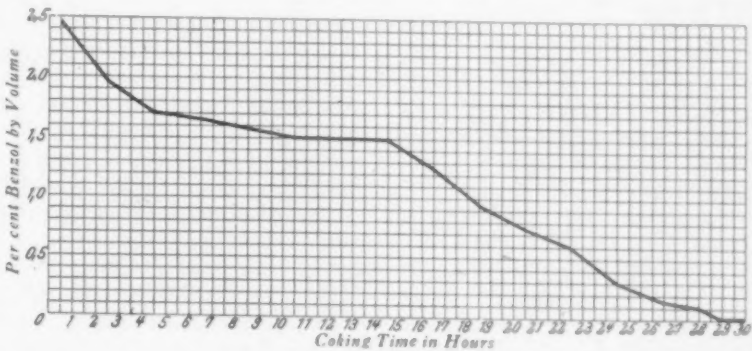


Fig. 3—Some Benzol in the Gas in the Twenty-eighth Hour

began to rise from 100 deg. C. at the end of the tenth hour, at the narrow end of the oven, and at the end of the thirteenth at the other end.

Average analyses of the coal and coke are given in Table 2.

The small percentage of volatile matter shows that in both tests the coke was good. The results also show that with suitable arrangements for heating from above high top temperatures are not produced. The temperature of 800 deg. C., which is the minimum required in the space above the gas for the decomposition of ammonia, is not reached. The alternate heating from above and below brings about an even

heating of the walls with high ovens, so that

Table 2.—Analysis of the Coal and Coke

	Test 1, per Cent	Test 2, per Cent
Coal: Ash.....	5.68	6.14
Water.....	11.20	12.52
Volatile matter.....	31.08	31.14
Total sulphur.....	1.51	1.49
Fixed carbon.....	68.92	68.86
Coke: Ash.....	7.26	7.92
Volatile matter.....	2.84	2.91

with this method coke ovens could be built 4 meters high (12 ft. 3.5 in.) without danger G. B. W.

A Rhyming Market Letter of 1910

David Evans & Co., Chicago, have reprinted by request their rhyming market letter of May 20, 1910, which is strikingly applicable to developments in the pig-iron trade this year. The letter, which will undoubtedly be enjoyed by our readers, is as follows:

"The pig-iron salesman makes his rounds when the market saggeth low, and covers the old familiar grounds that the pig-iron buyers know. He argues the higher price of ore, he argues of booms long past, and questions 'with labor costing more, can these low prices last?' He argues until in the face he's blue and when his tale is done the buyer says a decline is due of fifty cents a ton.

"The salesman travels his weary way and life seems a hopeless thing till something touches the spot one day and the bells begin to ring. Then Ho for the code book and telegraph! and Ho for the telephone! and this is the salesman's time to laugh and the laggard's time to groan; for those who argue or hesitate are certain to miss their chance, and have the joy to participate in a fifty cent advance.

"The contract-clerk's on the job once more, he burneth the midnight oil; and who cares now for the cost of ore or the price of the workman's toil? The sun shines bright and the clouds are few, the chill from

the air is gone; the sky is the only thing that's blue when a buying movement's on. The buyers buy and the sellers sell and life hath a rosy hue. If you listen well you can hear the bell! We're ready right now—are you?"

Redesigned Vertical Shrapnel Milling Machine

The Newton Machine Tool Works, Inc., Philadelphia, Pa., has redesigned its extra heavy vertical milling machine. The changes include the application of alternating-current motor drive with a speed box, a counterweighted spindle saddle with power vertical feeds and fast power movement and the inclusion of reversing fast power traverse to the table motions. The spindle has speeds ranging from 8 1/2 to 232 r.p.m. and the changes are secured without removing any gears from the speed box. The circular, in and out and cross table motions have reversing power feeds and hand adjustments, all of which are controlled from a centralized position. These machines can be used with end mills as small as 1/4 in. in diameter for die sinking or for handling heavy locomotive work. At the present time many of them are being employed for milling solid shrapnel forging ends, as the circular feed is continuous.

# Electric Welding as Developed to Date\*

Three General Processes, Supplementary Rather than Complementary to One Another—Possibilities Only Beginning to be Understood

BY C. B. AUEL†

There are three clearly defined processes of electric welding—arc, incandescent and electro-percussive—of which the last is very recent. The arc processes are autogenous in that welding can be accomplished without pressure, simply by allowing the metals to melt under the influence of the electric current, then to mix and unite as they cool; the incandescent and electro-percussive processes, however, invariably require pressure as a necessary adjunct to their successful accomplishment.

## Arc Process

### ZERENER PROCESS

In the Zerener process the apparatus employed resembles certain types of direct-current flaming arc lamps, the carbons being inclined toward each other and automatically adjusted by a suitable mechanism as they are consumed. By means of an electro-magnet, the arc, which is formed between the ends of the carbons, is directed downward in the shape of a pencil point. The metals to be welded are brought within the influence of the arc where they are then melted or fused as desired. The apparatus is complicated and does not lend itself readily to the carrying of large currents. It is not used in America and only to a limited extent elsewhere.

### BENARDOS PROCESS

In the Benardos process, the arc is drawn between a carbon electrode, which forms one terminal of a direct-current circuit, and the metal to be welded, which forms the other electrode. The welding apparatus itself, aside from the current supply, is exceedingly simple, and there is little to get out of order. As a minimum, 15 kw. at approximately 70 volts should be provided, though rather greater capacity is desirable especially when large work is likely to be undertaken. The voltage across the arc will ordinarily range from 40 to 50 volts, depending upon the class of work.

### SLAVIANOFF PROCESS

In the Slavianoff process, the arc is drawn between a metal electrode, which forms one terminal of a direct-current circuit and the metal to be welded, which forms the other electrode. Otherwise, the apparatus is similar to that used in the Benardos process, although the minimum current supply necessary in this latter process may be said to be the maximum supply required in the Slavianoff process. The voltage across the arc is also lower in the Slavianoff than in the Benardos process, ranging from 18 to 30 volts.

### TEMPERATURE OF ARC

The temperature of the carbon arc has been variously estimated to lie between 3500 and 4000 deg. C. All metals may be readily melted by it. In a direct-current carbon arc, the greatest energy con-

sumption and, therefore, the highest temperature occurs at the positive terminal.

When using the Benardos process, and making the metal to be welded the positive electrode, as is the practice, melting of the metal should and does take place at a faster rate than if the carbon electrode were made the positive. In the latter case, it is exceedingly difficult to weld at all below 500 amperes. The reason for this may lie in the fact that the conductivity of an arc depends in great measure upon the kind as well as the quantity of vapor in it. As iron and steel are more readily vaporized than carbon and their vapors better conductors than carbon vapor, there is, for a given current and with the metal forming the positive electrode, a greater quantity of metal vapor in the arc than would be the case were the polarity reversed and therefore current flows more readily from the metal to the carbon electrode.

In the Slavianoff process where both electrodes are of metal, the limitation just explained does not exist, and welding may be effectively done with either the work or the electrode as positive, though it is more usual to make the former positive. There might, however, be occasions when it would perhaps be of advantage to reverse these conditions and make the metal electrode positive so that the melting and therefore the deposition of metal would be more rapid owing to the greater heating effect at the electrode.

In both the Benardos and the Slavianoff processes, there are required, in addition to the direct-current supply with its necessary controlling apparatus, electrode holders and electrodes, coverings for the operator and the work, fire clay or carbon blocks, etc., for molding purposes, fluxes and metal filling material.

Direct current, at approximately 70 volts for the Benardos and 50 volts for the Slavianoff process, is necessary. A higher voltage may be used, but is wasteful and is only to be recommended where the amount of welding required is either so small or so infrequent as not to make advisable the installation of a separate outfit; and any excess voltage must first be reduced to the proper amount by the introduction of suitable resistance into the circuit. Satisfactory welds may be made in the Benardos process with 15 kilowatts capacity and even less; it is, however, preferable to have more where large pieces are to be handled or where more than a single operator is to be employed, and similar reasons govern in the Slavianoff process. If current is obtained from an independent source the dynamo should be compound wound with an over-compounding of about 5 per cent.

### CONTROL OF THE CURRENT

Means for controlling the current supply and the voltage across the arc must be provided, since welds of different kinds will require varying current strengths at varying voltages across the arc. This is attained by the use, generally, of resistance introduced into the main circuit, though sometimes the same result may be secured by weakening the

\*Abstract of a paper presented at the International Engineering Congress, San Francisco, Sept. 20-25, 1915.

†Director of standards, processes and materials, Westinghouse Electric & Mfg. Company, Pittsburgh.



field of the dynamo. This latter method is, however, extremely limited in its application as it can only be used when a single operator is at work; otherwise, other operators on the same circuit would be seriously handicapped. Fig. 1 shows a complete circuit in practically its simplest workable form, and in which barrels of water are employed for resistance.

Metal resistance grids can be substituted with certain advantages for the water barrels, as the latter in time require to be replaced due to the hoops rusting away; furthermore, the resistance of the water changes as it becomes heated, necessitating an occasional readjustment; and, finally, if the outfit is worked very hard the water boils over, involving a stoppage of work in order to allow the water to cool. All other schemes of connections are but variations of the above. In theory, such schemes may show to advantage over the simple diagrams of connections described; but, in practice it is reliability and simplicity that are essential above everything else, and a dynamo, when especially designed for welding, should withstand such loads as are thrown upon it. Further, too much stress is laid upon efficiency, whereas it is of secondary importance since current is drawn from the dynamo only at irregular intervals, possibly averaging 15 to 30 min. out of every hour even when the outfit is in constant service.

Carbon electrodes will range from  $\frac{1}{4}$  to  $1\frac{1}{2}$  in. diameter by 6 in. to 12 ft. long, depending upon the class of welding, whether large or small, and both

of these higher limits may be exceeded in certain cases. The carbons should be solid, should neither crack, crumble nor spindle, and should preferably be graphitic rather than common, as the former type is of higher electrical as well as thermal conductivity.

Metal electrodes will range from  $\frac{1}{8}$  to  $5/16$  in. in diameter by approximately 12 in. long likewise depending upon the class of welding. For welding in wrought iron and steel, nothing can excel the genuine Norway or Swedish iron.

#### FLUXES AND FILLING MATERIAL

No flux is needed for welding either wrought iron or steel, the field to which arc welding has thus far proved to be particularly adapted. For welding wrought iron or steel, various filling materials may be used, among them being Norway—or Swedish—iron rods, boiler iron, scrap, bits of steel castings, etc.; for cast or malleable iron, Norway—or Swedish—iron rods or special cast-iron rods with a high percentage of silicon.

In the Benardos process, the carbon electrode must be connected to the negative terminal of the circuit, the metal to be welded to the positive terminal either directly, or if more convenient, indirectly by being laid upon a metal table, Fig. 1, to which the positive terminal has previously been connected. In the Slavianoff process, welding may be effected regardless of the connections. The resistance of the circuit should next be adjusted to what is deemed to be the proper amount, after which the circuit-breaker or relays and the line switch are closed. The operator then takes his

position with the electrode holder in one hand and the hood (for the Benardos process) or the shield (for the Slavianoff process) in the other. Bringing the electrode as close to the metal to be welded as possible without actually touching it, he then pulls the hood down over his head or raises the shield in front of his face, touches the electrode to the work and instantly pulls it away the required distance, thus striking the arc, which, when a metal electrode is used, will approximate  $3/16$  in., while when a carbon electrode is employed, will vary from  $\frac{1}{2}$  to 2 in. or even more in length, according to the work being done.

In using the carbon electrode, the arc should be given a rotary motion by hand, thus heating the metal to be welded more uniformly and preventing burning. It should also be borne in mind that the longer the arc, the less chance there is of carbon entering the metal and producing a hard weld. When the metal reaches a molten condition, filling material is added to it, bit by bit, the arc being interrupted only just long enough to add such material, then being struck and played upon the mass again; or the filling material can be used in the form of a long rod, one end of which is inserted in the molten metal and the arc played upon it until the end is melted off and fused with the mass.

In joining two pieces of any but the thinnest sheet metal together, the abutting edges should first be chamfered at an angle of about 45 deg. either from one or both sides, depending upon the thickness of the material, and the cham-

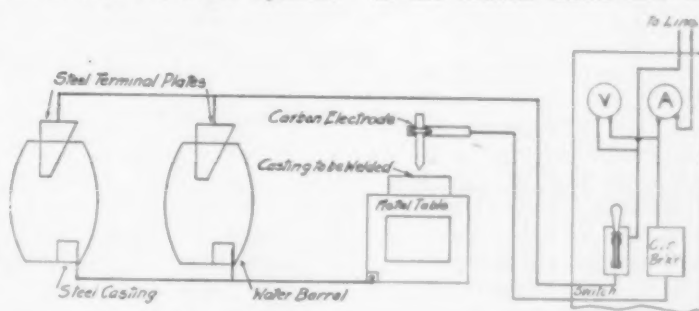


Fig. 1—Diagram of Arc-Welding Circuit, Bernardos Process, Water Barrel Resistance

fer should extend entirely through.

As soon as the weld has been completed and while still at a white heat, it should be briskly hammered in order to give the metal a finer grain. All oxide and other impurities should, of course, be kept out of the weld. The metal to be welded should accordingly be chipped or machined in the vicinity where the weld is to be made; or the same result may be accomplished by tilting it to a suitable angle, then turning the carbon arc upon it and allowing the slag, in melting, to fall away by gravity.

Heating the metal preparatory to welding is always beneficial as preventing and relieving strains, but is not resorted to except in special cases. Annealing is also desirable at times but like preheating, is not done except when absolutely necessary. A very decided economy can sometimes be effected by repairing a defect discovered during a machining operation, by making the repairs without removing the piece from position.

#### METALS WHICH CAN BE WELDED

Both of the electric arc processes are particularly well adapted to the welding of wrought iron and steel of various kinds; and, while certain other metals including cast iron can also be welded, the work is not, generally speaking, done to any advantage over some of the other processes. Welds in cast iron will prove quite variable when made by the average operator, being frequently glass hard and uncertain as to strength, so that at the present time, it would be rather unwise to make any pronounced claims for arc welding in this connection.

With malleable iron, the results obtained are even more variable than with cast iron.

#### COMPARISON OF ARC PROCESSES

With the Benardos or carbon electrode process, more welding can be performed in a given time than can be accomplished with the Slavianoff or metal electrode process; and viewed from this standpoint alone, the former is the cheaper. As with cast iron, the welds will, however, at times be decidedly hard, so much so as to be occasionally impossible of machining due to carbon from the electrode entering the metal; but when no subsequent machining is necessary, hardness is no disadvantage; and, in some kinds of work, such, for example, as the rebuilding of the ends of rolling mill wabblers, pinions, etc., this very condition is a decided advantage.

In the Slavianoff process, the difficulty of hard welds is largely overcome. The welding of thin sheets can be more readily done and, in fact, a finer grade of work of the lighter kinds performed than with the Benardos process; finally, the ability to reverse connections may be an occasional advantage.

#### CUTTING AND OTHER APPLICATIONS

In cutting wrought iron or steel with the Benardos or carbon arc the cut will be wider and the edges not comparable in smoothness with any of the oxy-gas cutting processes. However, where electric current is readily available and the finish of the cut is not of especial importance, as in the removal of sink heads and risers from steel castings, it is probably one of the cheapest methods for such work, since almost no time need be spent in setting up the casting in position, as is necessary when cutting by machine or hand. Fig. 2 shows the rate of cutting steel with the electric arc.

The electric arc processes of welding were originally largely confined to repair work in wrought iron and steel, but since becoming better understood, their uses are extending; for example, surplus metal including fins, risers, sink-heads and nails are easily removed from steel castings, holes are bored in wrought iron or steel plates, wrought iron or steel pipe sections are readily joined together or flanged, the ends of wrought iron rings are welded, wire nails may be pinned to wrought iron or steel plates, tap holes or tuyères in furnaces

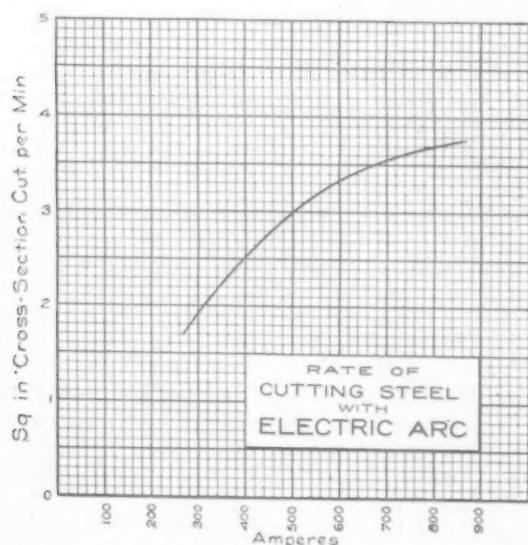


Fig. 2—Amount of Material Cut, Using a 1-In. Graphite Electrode

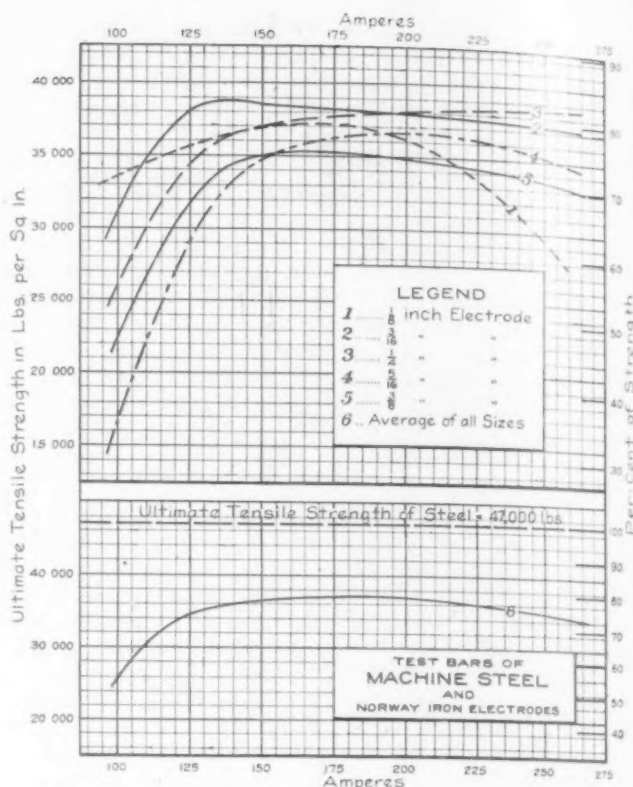


Fig. 3—Strength of Machine Steel Welded with Norway Iron Electrode

are opened, broken drills and taps are easily removed from castings, etc.

The following figures have been obtained in the works of the Westinghouse Electric & Mfg. Company, as regards the cost of welding rings by the blacksmith and by the carbon arc respectively.

Sections	Smith Welds*	Arc Welds*
1 x 1½ in.	\$0.59	\$0.51
1½ x 1½ in.	0.66	0.30
1½ x 2 in.	1.13	0.45
1¾ x 2½ in.	1.25	0.45
2 x 6 in.	3.05	0.85

\*Labor costs only included in above.

For filling a drilled hole, 1¼ in. diameter by 2 in. deep in a cast steel axle cap, a 1½ x 6 in. carbon electrode was used. The current ranged from 500 to 650 amp., and the time required was 56 sec.

The following table shows the current used and time required for welding sheet steel seams:

Welding Sheet Steel Seams			
Gage B.W.G. or In.	Metal Electrode, Diameter, B.W.G. or In.	Current Amperes	Rate of Welding, Ft. per Hr.
28 to 20	18	10 to 25	30
18 to 14	1/16	20 to 40	25
14 to 3/16	3/32	30 to 60	20
3/16 to 1/4	1/4	50 to 100	15
1/4 to 5/8	5/32	75 to 150	10
Over 5/8	5/32	150 to 180	Variable

To burn a hole 1¾ in. diameter by 1½ in. deep in a wrought iron plate, using a 1½ x 6-in. carbon electrode, utilized a current of from 370 to 1000 amp., and required 3 min., 30 sec., including 45 sec. for reversing plate. A sink head of 13½ sq. in. cross-sectional area was removed from a cast steel axle cap in 4 min., 45 sec., including time for set up, with a current of 600 to 850 amp., and using a 1½-in. by 6-in. carbon electrode.

The table below shows the time required for cutting steel with the electric arc, using a graphite rod 1 in. diameter as the negative electrode:

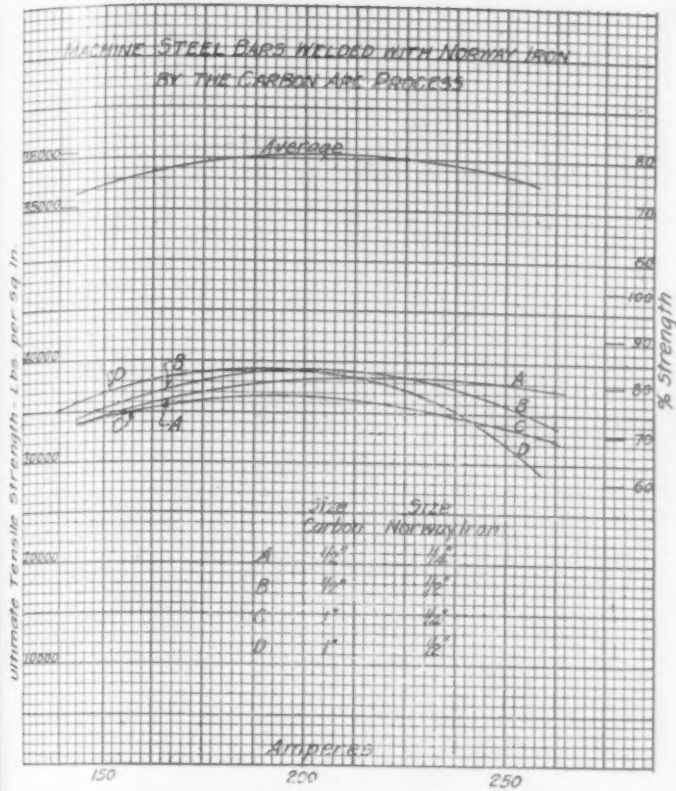


Fig. 4—Strength of Machine Steel Welded with Carbon Electrode and Using Norway Iron Filling

Cutting Steel with the Electric Arc

Size of Section Cut, in.	Area Cut, Sq. In.	Cutting Current, Amp.	Cutting Time, Min.	Cross Section Cut	
				per Min., Sq. In.	Min. per 100 Amp., Sq. In.
8 x 8.....	64	810	27.00	2.37	.293
8 x 8.....	64	600	41.75	1.53	.255
8 x 8.....	64	320	98.00	0.65	.203
6 x 6.....	36	810	14.50	2.48	.306
6 x 6.....	36	600	21.67	1.66	.277
6 x 6.....	36	320	44.33	0.81	.253
4 x 4.....	16	810	4.70	3.40	.420
4 x 4.....	16	600	5.62	2.85	.475
4 x 4.....	16	320	10.08	1.60	.500
2 x 4.5.....	9	810	2.50	3.60	.445
2 x 4.5.....	9	600	2.53	3.56	.577
2 x 4.5.....	9	320	5.05	1.78	.557
1 1/2 x 3 1/2.....	4.47	810	1.10	4.06	.502
1 1/2 x 3 1/2.....	4.47	600	1.17	3.82	.637
1 1/2 x 3 1/2.....	4.47	320	2.25	1.98	.619
825 x 4.....	2.5	810	0.67	3.73	.451
825 x 4.....	2.5	600	0.83	3.07	.512
825 x 4.....	2.5	320	0.88	2.84	.888

Average rate of cutting, 454 sq. in. per min. per 100 amperes.

STRENGTHS OF WELDS

Often the strength of the weld is of small consequence as it is simply a matter of filling up blow holes or equivalent imperfections, and even where strength of weld is involved, the metal to be welded usually has a large factor of safety, so that even though the welded portion may not be equal in strength to the original material, it still will have a considerable margin of safety. Furthermore, the material at the weld can often be reinforced so that a strength equal to the original can thus be obtained.

With the carbon electrode process, the current will range from possibly 100 to 600 amp. or more, depending upon conditions; in cutting, the figures will usually run slightly higher. With the metal electrode process, the current for welding will range from 10 to 200 amp.

In Figs. 3, 4 and 5 are shown results obtained by both processes. It will be noted that in these curves there seem to be indicated certain best limits for current and size of electrode, and in the carbon arc process, the

further fact that too rapid work as indicated by Fig. 4, curve D, is harmful. Either process will give about the same strength of welds, but in machine steel the ultimate strength will average approximately 80 per cent of the original, while in cast steel the strength of the welds will run 10 to 12 per cent lower.

(To Be Continued)

French Needs After the War

Robert Pinot, general secretary of the Comité des Forges de France, is reported in an Associated Press cablegram from Paris as expressing the following views:

"It is unfortunately true that we must look to the United States for several years to supply us with money or credits and with raw and manufactured materials. We will be working for the next twenty years to pay what we owe. Not before that time can we begin to put any profits in our own pockets. The fear that so soon as the war is ended the manufacturers now busy making arms and cannon and shells will convert their factories into the making of products to compete with yours is ungrounded.

"We will have the enormous task of rebuilding our old steel plants, of reconverting our automobile, button, cloth, printing, and railroad shops, all now busy making munitions, back to their old uses. We will have to try to repair the vast material destruction that has come with the war. Then we will have to do our best to satisfy our own home markets. To do these things we will have to continue to buy of you, as we are now doing for war supplies."

The American Boiler Manufacturers' Association has issued its convention proceedings for the meeting held in Erie in June this year, in the shape of a pamphlet of 180 pages devoted in a large part to the work of developing uniform boiler laws. The deliberations and the discussions are given at length. The secretary is J. D. Farasey, H. E. Teachout Boiler Company, Cleveland, Ohio.

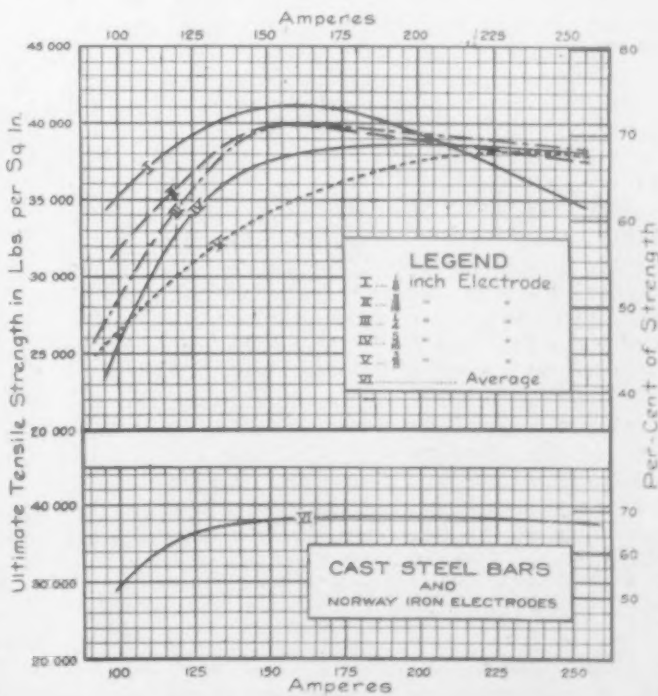
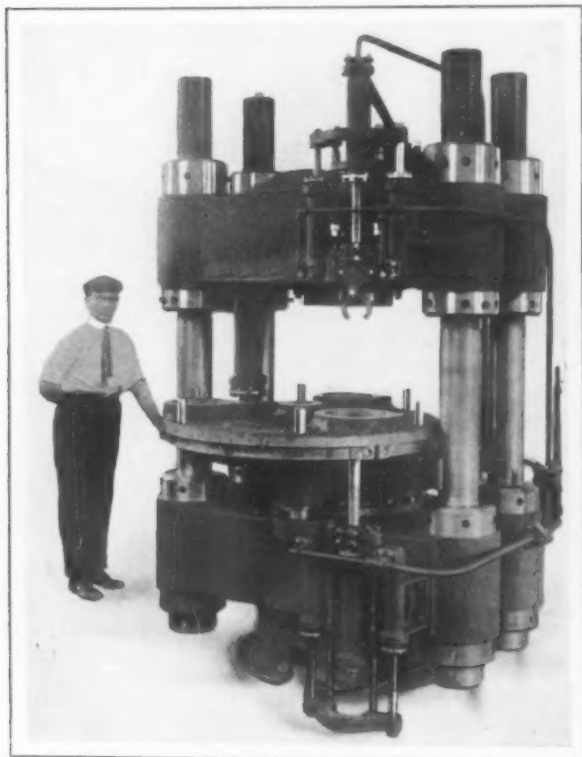


Fig. 5—Strength of Cast Steel Welded with Norway Iron Electrodes



## Hydraulic Cartridge Case Heading Press

The Hydraulic Press Mfg. Company, Mount Gilead, Ohio, has added a press for heading brass shells after they have been indented to its line of projectile presses. Multiple dies make the press practically continuous in operation and a special



A 1000-Ton Hydraulic Press for Heading Brass Cartridge Cases Equipped with Three Dies to Make the Operation Practically Continuous

hydraulic ejecting device is provided to remove the shell after the heading operation is completed.

The press is of steel construction throughout, the base and the cylinder being cast in one piece. The heading operation is accomplished by inserting a fullering block between the head of the press and the top of the cartridge case, the latter being held in place by a die. As pressure is applied the fullering block causes the brass to flow outward in all directions to form the head of the shell.

The press has a turret with dies to receive three shells. It revolves on a spindle mounted on ball bearings which are set in the front of the press between the strain rods, and to bring the shell to approximately the proper position for being headed, the turret is revolved by hand, the power being applied to handles located at equal distances around the outer edge. The rotation is further controlled by an indexing device which is relied upon to bring the shell in the proper place directly under the fullering block. The indexing device is operated by a lever, which when pulled disengages the index latch from the turret, clearing and releasing the latter for revolving. The lever controlling the operation of the indexing device is at the extreme right in the accompanying illustration. The arrangement of the three dies makes the operation of the press practically continuous, as there is one shell awaiting the heading operation and one being unloaded, while the third is undergoing the heading operation.

The shell is pulled from the die when the heading operation is completed by a hydraulic ejecting device. This consists of two rams, one attached to the base of the press and the other to

the head, the latter having spring gripper jaws for taking hold of the shell head. The ram attached to the base of the press forces the shell out of the die sufficiently for the gripper jaws on the upper ram to take hold and pressure is applied to the two auxiliary pull-back rams of the lower ejector ram to return it. The finished shell is then removed from the gripper jaws of the upper ram and pressure is applied to that pair of auxiliary rams to make the device ready for the next shell. The maximum pressure of the two ejector rams is 5 tons each and the use of two such rams each working toward a common center, it is pointed out, makes the ejecting operation very rapid and clears the turret in a short time, so that it can be revolved quickly to enable the next shell to be headed.

The total pressure capacity is 1000 tons and the number of shells that can be headed depends upon the capacity of the pump employed for operating the press. With a pump supplying  $19\frac{1}{4}$  gal. per minute at a pressure of 3250 lb. per square inch 210 shells can be headed in 1 hr. The main ram is 28 in. in diameter with a 12-in. stroke and the daylight space of the press can be varied between 30 and 45 in.

## Portable Electric Air Warmer and Blower

The B. F. Sturtevant Company, Hyde Park, Boston, Mass., has placed a portable electric warm-air blower on the market. It may be used in the same way as are electric cooking utensils in connection with the ordinary wiring system. It is offered for more or less temporary heating in a garage; for drying paint and also for drying in dyeing, photographic and blueprint rooms, and for heating rooms used only occasionally.

The outfit consists of a small motor-driven fan discharging air through electric heating coils placed in an aluminum casing, the forced circulation being relied upon to give a very large volume of air in a short time. Five different sizes of sets are made and the air is delivered at one, two or three temperatures, depending upon the size. The fan outlet can be turned to discharge in any direction and the switch mounted on the base has different positions to control the temperature of the air delivered.

## Large Motor-Driven Superheated Steam Valves

Seven 42-in. solid wedge steel gate valves standing 14 ft. high have been installed in the new station of the Philadelphia Electric Company by the Nelson Valve Company, Chestnut Hill, Pa. The valves are designed for operation under a pressure of 80 lb. from the central panels on the turbine operating floor, which is 50 ft. above the condenser pit floor line where the valves are installed. A steel clutch for disengaging the motor if it is desired to operate the valves by hand is furnished, but the limit switch is in position at all times to open the circuit at the proper closing point of the valve disk irrespective of whether the operation is by hand or by motor. A lost motion device is provided between the manganese bronze stem unit and the large operating gear, which gives a hammer blow effect to break the seat of the valve in the event of scale causing the wedge to adhere to the seat.

Local meetings of the American Society of Mechanical Engineers are to be held in Buffalo on Dec. 15, when the subject of "Engineers in Politics" is to be taken up by C. E. Drayer, secretary of the Cleveland Engineering Society, and on Jan. 5, when "The History of Iron" is to be discussed by Dr. John A. Mathews, president of the Halcomb Steel Company, Syracuse, N. Y.

The plant of the Standard Chain Company, Mansfield, Ohio, which has been shut down for some time, will be started up shortly.

## SCIENCE AND ENGINEERING

Presidential Address of Dr. John A. Brashear  
Before the Mechanical Engineers

That science and engineering "join hands for the betterment of our loved profession" was urged by Dr. John A. Brashear of Pittsburgh in his presidential address by which he opened the annual meeting of the American Society of Mechanical Engineers in the Engineering Societies Building in New York Tuesday evening. As usual, the evening was given over to the address of the retiring president; the introduction of the president-elect, who is Dr. D. S. Jacobus, advisory engineer for the Babcock & Wilcox Company; a reception by the officers, and a supper and general reunion in the society's rooms.

Dr. Brashear looks upon the research fund instituted by Ambrose Swasey as fostering the opportunity to bring pure and applied science together, and he quoted at length from a letter sent to Mr. Swasey by Dr. George Ellery Hale, which letter contained this sentence: "The man of science is liable to underestimate the importance of practical applications of his subject, while the engineer is in danger of forgetting that if research were conducted only in the hope of securing profitable ends, most, if not all, of the great discoveries which lie at the very foundation of both pure and applied science, would never be made."

The address was in part as follows:

The complaint seems to be that science with its analysis of color robs us of the pleasing sense of awe and mystery, but if you dig deep you will find enough mystery left to satisfy the keenest yearner after half lights and the obscure. There comes a joy to the lover of the beautiful that cannot be expressed in words, for he sees in the color of an American Beauty rose the same light waves that tint yonder red star, whose light waves, coming to him at the rate of 180,000 miles per second, left it a thousand years ago.

Does the photographic picture of your favorite landscape lose any of its beauty when you are told that during an exposure in your camera of only one-tenth of a second, from four to eight thousand millions of millions of light waves have hammered upon your negatives tending to shatter them to pieces or change their molecular arrangement?

Maclaurin gives a charming illustration to help us better understand what it means when a ray of violet light impinges on our photographic plate for one-tenth of a second. Imagine you are watching a log floating near the seashore, and that it strikes against a pier as it rises and falls with the waves, say, once in six seconds. In order to correspond to the number of light waves in one-tenth of a second, the log would have to beat against the pier for more than two million years.

## THE LINE BETWEEN PURE AND APPLIED SCIENCE

There has often arisen in my own mind, and no doubt in yours, the question, where shall we draw the line between pure and applied science? For myself, I have been unable to find aught but a hazy line of demarcation.

Our standard meter, measured in terms of the red radiations or wave length of cadmium, equals 1,553,163.5; for the green radiation, equals 1,966,249.7, and for the blue radiation, 2,083,372.1, in air at 15 deg. C. and normal atmospheric pressure. Michelson tells us that the absolute accuracy of these measures is one part in two millions, the relative accuracy, one part in twenty millions.

Getting nearer the utilitarian service of the scientific study of light waves, let me say that Dr. Anderson of the Johns Hopkins University has utilized them in making screws of hitherto unheard-of accuracy. Let me quote from a letter received from Dr. Anderson before writing this address:

In reply to yours of the 4th, I will say that from measurements made by using a Fabry and Perot Interferometer, the screws we have made for ruling purposes have the following accuracy:

1. The maximum variation in pitch along the screw did not exceed one-tenth millionth of an inch. (By pitch I mean

the average value of the pitch as given by a well-fitting nut 3 or 4 in. long.)

2. The axis of the screw had a radius of curvature longer than 250 miles.

3. The axis of each pivot or bearing coincided with the axis of the screw to within one two-hundred thousandth of an inch.

These are three important quantities as far as the screw itself is concerned.

When the screw is mounted ready for use, it is also important that it be prevented from moving endwise or longitudinally when it is rotated. Our mounting, using the flat ruby against a spherical steel surface, makes it possible to reduce this motion to something less than one-millionth inch. Errors of the magnitude given above can be easily detected with the interferometer.

Our fellow member, George M. Bond, has given us a most valuable compendium of the development of measures of precision in his work on "Standards of Length." Let me add some altruistic words of our good friend Dr. Pritchett: "The last fifty years have seen a greater betterment of the theoretical basis of physical science than ever before in the history of the world. This development has been marked by a notable stimulation of scientific research, a differentiation of scientific effort, and the creation thereby of a great number of special sciences or departments of science."

## Decreased Imports of Iron Ore

The extent to which the war has affected our receipts of foreign iron ore are easily grasped from the data in the following table based on Government official statistics:

	1913, Gross Tons	1914, Gross Tons	1915, Gross Tons
September .....	109,176	173,253	
August .....	134,913	126,806	
July .....	141,838	119,468	
Nine months ended			
Sept. 30 .....	1,916,733	1,094,972	971,098
Year ended June 30..	2,246,353	2,167,662	1,193,114

Iron-ore imports for the first nine months of this year were thus only about half those of the corresponding period in 1913, while for the year ended June 30, they are also nearly 50 per cent less than for the fiscal year of 1913. Analyzing the receipts as to countries for the nine months ended Sept. 30, 1913 and 1915, we have the following data:

	To Oct. 1, 1913, Gross Tons	To Oct. 1, 1915, Gross Tons
Spain .....	93,868	32,946
Sweden .....	277,129	154,619
Canada .....	132,832	48,235
Newfoundland and Labrador..	162,148	None
Cuba .....	1,177,665	610,698
Other countries .....	73,091	126,600

The decrease in each case is due almost entirely to lack of shipping facilities. No Wabana ore has been received this year. The increase in ore from "other countries" is probably due to the activity of the Bethlehem Steel Company in securing ore from Chile.

## Steel Corporation Accepts Compensation Act

At a meeting Dec. 1 the Pennsylvania Workmen's Compensation Board received notification from the United States Steel Corporation that it will accept the compensation law which goes into effect Jan. 1. The letter of acceptance from David A. Reed, of counsel for the United States Steel Corporation, set forth that the Steel Corporation and its subsidiary companies in Pennsylvania will make every effort to comply with the act. "It is the disposition of the Steel Corporation and its executive officers without exception," says the letter, "to do all in their power to comply, not only with the letter but the spirit of this law."

The Burgess-Norton Mfg. Co., hardware specialties, screw machine products and steel stampings, Geneva, Ill., is erecting an addition to its plant, which is located at Geneva and not at Aurora, as printed in THE IRON AGE of Nov. 25. This addition is due to a steady growth in the company's business. It has not taken any ammunition contracts.

# Manganese-Steel Castings for Mining\*

## Their Metallographic Characteristics and Some of Their Uses—The Foundry Practice and the Heat Treatment

BY WALTER S. MCKEE

When mixed with common cast steel in quantities ranging from 11 to 13½ per cent and properly treated, manganese increases the ductility of the metal and adds greatly to its toughness and resistance to abrasive action, which properties comprise the distinctive characteristics that make manganese steel so valuable for many purposes at the present time.

Manganese steel has been manufactured for about 26 years. It was first made in a small way in England and subsequently produced in the United States in 1892. At present the manganese steel foundries of this country have an annual capacity of about 60,000 tons and most of the growth has occurred within the past 10 years. In the early days of the industry it was impracticable to make manganese castings weighing over a few thousand pounds, but at present crusher heads, rolling-mill pinions, and similar castings weighing up to 30,000 lb. each are produced, and it does not appear that the limit of weight has been reached by a considerable margin.

Manganese steel is similar in analysis to ordinary first-class converter metal except that it is high in carbon and contains from 11 to 13½ per cent of manganese. From one standpoint manganese steel is similar to malleable iron in that the casting as it comes out of the sand is hard and brittle and must be made ductile by a heat-treating process. The heat treatment is an essential part of the process of making manganese steel castings and must be properly carried out to secure satisfactory results. The necessity for heat treatment limits the thickness of sections which may be made of manganese steel. Originally the annealing depth was comparatively small, but researches carried on during the past few years have resulted in an increase in the thickness of section up to 5½ in., which it is possible to treat successfully.

Large castings are cored out to a minimum thickness of 5½ in., thus not only eliminating some of the internal stresses which are invariably set up in a very thick casting, but also reducing the weight and inertia of the piece, an important consideration if the casting is to be a moving part in a machine. At the same time, the thickness of 5½ in. is sufficient to permit the use of manganese steel for the heaviest classes of machinery.

Before taking up the application of manganese

steel castings to machinery used in the mining industry, a few details covering the chemical and physical characteristics as well as the microstructure of this material will be presented. Chemically, cast manganese steel has about the following composition:

	Per Cent
Carbon .....	1.25
Silicon .....	0.30
Manganese .....	12.50
Sulphur, less than .....	0.02
Phosphorus, about .....	0.08

The following results are an average of nineteen physical tests of manganese steel: Elastic limit, 53,396 lb. per square inch; tensile strength, 108,460 lb. per square inch; elongation in 2 in., 33.71 per cent; reduction of area, 38.56 per cent. These tests are characteristic of most manganese cast steel.

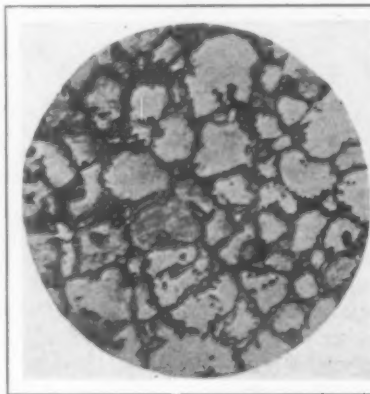


Fig. 1—Structure of Manganese Steel as Cast, X 80

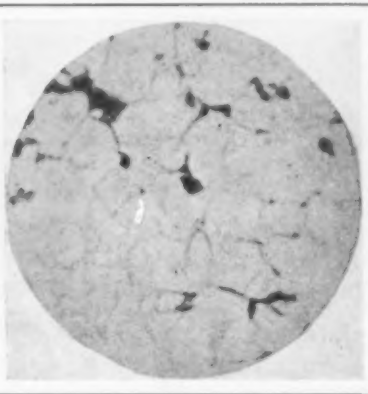


Fig. 2—The Same Steel Incorrectly Heat Treated, Some Cementite Visible

### METALLOGRAPHIC CHARACTERISTICS

The distinctive characteristics of this steel are clearly indicated by the microscope. As is well known, manganese is present in all ordinary steel, but the metal does not become austenitic until about 6 per cent manganese and 0.80 per cent

carbon are introduced. Commercial austenitic manganese steel generally contains from 11 to 13.5 per cent manganese and from 1 to 1.30 per cent carbon.

In the cast state, manganese steel is composed principally of austenite and free cementite, austenite being a solution of iron, manganese and the carbide of iron and manganese, while free cementite is composed of the carbides of iron and manganese which remain undissolved. Free cementite is hard and brittle, therefore manganese steel is also brittle in the cast condition. We thus have a metallographic explanation of the chief characteristics of manganese steel. Microscopic examination reveals the fact that if the steel is heated to a proper temperature and quenched in water, the free cementite is dissolved and the whole becomes austenite.

The accompanying photomicrographs, Figs. 1 to 5, show the structures of manganese steel as cast and after treatment. Fig. 1 shows the structure of manganese steel in the cast condition. Fig. 2 shows the structure of the same steel heated to a temperature of 1750 deg. Fahr. and quenched in water. The heat treatment was not correct, and although much of the free cementite has disappeared, some of it still remains in chunks as shown by the dark spots. Fig. 3 shows the structure of the same steel heated to a temperature of 1800 deg.

\*From a paper to be presented at the February, 1916, meeting of the American Institute of Mining Engineers in New York. The author is vice-president of the American Manganese Steel Company.



Fahr. and quenched in water. In this case the heat treatment is correct and all of the free cementite has disappeared, leaving a purely austenitic structure.

The effect of subsequent heating and cooling in air is shown in Figs. 4 and 5. Fig. 4 shows the structure of a manganese steel which had received a proper heat treatment and was afterward heated to a temperature of 700 deg. Fahr. and allowed to cool in air. The structure is exactly similar to that shown in Fig. 3; the steel, therefore, has not been injured. Fig. 5 shows the structure of the same steel heated to a temperature of 750 deg. Fahr. and allowed to cool in air. A heavy separation of cementite, shown by the needle-like particles, is clearly visible. This proves that heating the steel to over 700 deg. Fahr. destroys the purely austenitic structure, seriously injuring the quality of the metal. It is therefore imperative that manganese steel should not be treated to a temperature exceeding 700 deg.

Fahr. after being heat treated. The experiments on which the foregoing photomicrographs are based were carried out with the aid of an electric furnace equipped with a pyrometer.

By the Brinell test, manganese steel toughened or untoughened shows the moderate average hardness number of about 200. The extreme outer surface of the treated steel shows a slightly lower number than at a depth of about  $\frac{1}{8}$  in., from which point the number remains constant to the core of the casting. The lowering of the hardness number at the surface is due to the oxidation of the carbon during the heat treatment.

#### USES OF MANGANESE CASTINGS

The qualities of manganese steel have led to its adoption extensively for the vital parts of heavy-duty machinery, particularly parts subjected to unusual wear, shock, etc. Manganese steel castings are used to-day in the construction of wearing parts for the following kinds of machinery:

Rock and ore crushers, coal breakers, ball mills, tube mills, pulverizers, comminutors, clay mills, traveling cranes, gold dredges, harbor dredges, steam shovels, ditching machines, pig-casting machines, pug mills, coke machines, steel-rolling machinery, stamp mills, cable haulage systems, screening apparatus, centrifugal sand pumps, grab buckets, concrete mixers, etc.

Manganese steel is also extensively used in the manufacture of steam and electric railway track work, elevator buckets, gears, pinions, mine and skip car wheels, and for numerous other purposes.

The use of manganese steel for tube-mill liners is a recent development which is of special interest at this time because of the curtailment in the supply of lining materials previously used, by reason of the war abroad. Until the introduction of man-

ganese steel liners, tube mills were lined almost exclusively with silex blocks imported from Europe, principally from Denmark. The pebbles used in tube mills also have been imported, chiefly from France and Denmark. The manganese steel liners have been developed to the point where they form a satisfactory substitute for silex blocks, and experiments are now being conducted on the use of 2 and 3-in. diameter manganese steel balls in place of imported pebbles. A manganese steel tube-mill liner known as the Komata, developed by E. C. Brown, is now used with good results.

As indicated in Fig. 6, it consists simply of a series of plates and lifting bars securely attached to the shell of the mill by square-headed taper bolts, drawn up from the outside, so that the plates are held in place even when worn extremely thin. The lifting bars perform an important function, their action being similar to the bars installed in Bradford coal breakers. The bars carry the pebbles up

to a point considerably beyond the center line of the mill, causing an almost perfect cascading action. For this reason the pebbles maintain a spherical shape and the great commotion and rolling action of these produces an effective grinding action. The pebbles do not slip on the liners, with the result that the life of the plates is prolonged and the tendency of pebbles to become flat is prevented.

The lifting bars are invariably made of manganese steel because of the great wear to which they are subjected. The lining plates are preferably made of the same material, but if local circumstances warrant, they can also be cast of less expensive semi-steel or white iron at local foundries. To prevent the liner

from cupping around the bolt holes, raised bosses are placed on the castings around each hole.

#### CONSUMPTION OF MANGANESE LINING MATERIAL

For the year ended June 30, 1914, one of the largest milling companies in Nevada reported the following consumption of lining material: Manganese steel lifting bars, 16,633 lb.; semi-steel liner plates, 49,916 lb. During this period 341,354 tons of ore were ground, comprising the discharge of twelve batteries equipped with three-mesh screens, together with the discharge from eight batteries passed through Chilean mills equipped with sixteen-mesh screens, both products being passed through Dorr classifiers before the sands were fed to six 5 x 22-ft. tube mills. The actual sliming done by the tube mills was estimated at 100 tons per day per mill, 80 per cent of the product passing through a 200-mesh screen. The pebble consumption for a similar period was 1,647,524 lb. At this plant a set of manganese steel lifting bars lasts about fourteen



Fig. 3.—The Same Steel Properly Heat Treated, Resulting in a Pure Austenitic Structure,  $\times 80$

Fig. 4.—Manganese Steel Correctly Heat Treated and Subsequently Heated to a Temperature of 700 Deg. Fahr. and Cooled in Air Without Changing the Austenitic Structure,  $\times 80$

Fig. 5.—The Same Steel Heated to 750 deg. Fahr. and Allowed to Cool in Air, Resulting in the Precipitation of Cementite, Injuring the Quality of the Metal

months and a set of semi-steel liner plates, which are  $1\frac{11}{16}$  in. thick at the center, tapering to  $11/16$  in. at the edges, lasts about twenty-three months.

In some of the mills manganese steel liner plates also were used. They were in service twenty-nine months and when removed weighed less than 30 lb. each. These plates were  $1\frac{1}{8}$  in. thick at the center, tapering to  $\frac{3}{8}$  in. in thickness at the edge.

Some interesting tests of manganese steel liners have also been made on a Schmidt-Davidson type mill in operation in New Zealand. This mill is

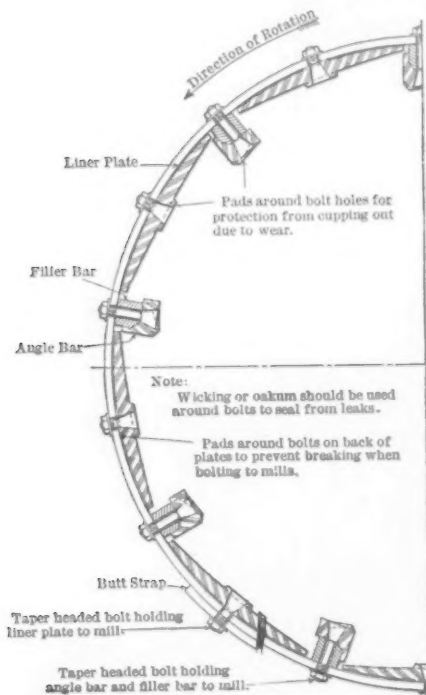


Fig. 6.—Half-Section of a Tube Mill Fitted with Manganese Steel Komata Lining Plates and Lifting Bars

4 ft. 6 in. in diameter and is run at 23 r.p.m., which was found to be the most effective speed when using lifting bars. The liners in this case were of hard, white cast iron made at a local foundry. When new, the liners were 1 in. thick in the center, tapering to  $\frac{3}{8}$  in. at the edges, the lining weighing 5940 lb. There were ten rows of ribs in the mill with an aggregate weight of 2347 lb. The liners were used for  $75\frac{1}{2}$  weeks and the angle bars for  $60\frac{1}{2}$  weeks before they required replacing. From 187 to 232 tons of ore were passed through the mill daily, these figures including the coarse sand which was returned to the mill as many times as necessary. The stamp delivered an average of 76 tons of ore to the mill daily. The pebbles were from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  in. in diameter.

#### MANGANESE MINING BUCKETS

Manganese steel has been found particularly suitable for dredge buckets in the gold dredging districts of Montana, California and elsewhere, the life of the manganese steel buckets being reckoned by years instead of months. The buckets usually are cast solid and the lips riveted in place; they range from 600 to 5000 lb. in weight each, the average being about 2200 lb. A number of buckets of this type have been in service since September, 1909, and judging from present indications their total life will be from ten to twelve years.

Usually placer dredge buckets are removed from service because the metal underneath the back eye wears away. In some cases the buckets are worn entirely through to the bushing at this point before they are taken from the line. The metal underneath

the back eye ranges from  $1\frac{1}{2}$  to 3 in. in thickness, depending on the size of the bucket. Some observations were recently made of the wear on fifty manganese steel buckets placed in service on a dredge in Montana in December, 1911. These have a capacity of 9 cu. ft. each. When new, the metal underneath the back eye had an average thickness of  $2\frac{1}{2}$  in. After having been in service for three years, actual running time, the buckets were again measured and the metal under the back eye was found to have been worn to an average thickness of  $1\frac{7}{8}$  in. In other words, about  $\frac{5}{8}$  in. of metal was worn away. This means that  $1\frac{1}{4}$  in. of metal are still available for wear, assuming that the buckets are worn out when the thickness is reduced to  $\frac{3}{4}$  in. Since the wear has amounted to  $5/24$  in. per year, the estimated total life of the buckets is nine years.

The application of manganese steel to steam shovel dippers was one of the first problems attacked by the manufacturers of this material in this country, the wear in this service being particularly severe. A dipper known as the Missabe type is made entirely of manganese steel. Its body consists of but two castings, the front and back halves, which give maximum stiffness and rigidity. This design permits the construction of a large dipper with only a few rivets. The bail brackets are set at an angle conforming to the line of pull on the bail. They are butted against shoulders or offsets which are formed integrally with the sides of the front castings and are riveted to the front half of the dipper, the joints between the front and back halves being placed at the rear of the brackets, thus throwing all the digging strains on the front casting, and relieving the rivets at the joints from shearing stresses. The teeth, which are easily renewable, are of cast manganese steel.

Dippers of the Missabe type of 10-cu. yd. capacity, which are believed to be the largest manganese steel dippers ever made, were used on dredges working in the Culebra Cut, Panama Canal. The weight of the empty dipper is 37,600 lb. and its overall dimensions are  $9 \times 9 \times 10\frac{1}{2}$  ft. The lips are  $3\frac{1}{4}$  in. thick and the fronts are the same thickness underneath the teeth. Between the teeth the fronts are  $1\frac{1}{2}$  in. thick, the thickness at the bottom band being  $3\frac{1}{4}$  in. The backs are  $1\frac{1}{4}$  in. thick, except at the bottom where the thickness is increased to  $3\frac{1}{4}$  in.

#### MANGANESE STEEL WHEELS AND GEARS

Manganese steel, although not suitable for railway car wheels on account of its comparative softness, has been found satisfactory for mine and skip-car and crane wheels. For crane wheels carrying heavy rolling loads, manganese steel has been found particularly satisfactory. Manganese steel crane wheels are in service to-day carrying loads of 90,000 lb. each, although 30,000 lb. has always been considered the limit of safe working load for chilled-iron wheels. A microscopic examination of manganese steel wheel under load will show a flat spot instead of a line contact as in the case of hard metal wheels; manganese steel under these conditions is springy and recoils as the load is released. The wheels also exhibit strong resistance to flange wear. This feature is worthy of consideration in view of the fact that derailments on curves are usually caused by the flanges having worn to the angle of least frictional resistance, allowing the inherent straight line force to push the wheel flange over the rail.

Where the loads are heavy, manganese steel is now being extensively employed for gears. For the past two years manganese steel spur gears have been

made with the teeth ground mechanically true, up to 44-in. pitch diameter with a 10-in. width of face. Many ordinary steel gears are cut with a range cutter which does not leave the rolling contact theoretically correct, whereas in grinding manganese steel gears, a trimming arrangement is placed on the grinder for the purpose of dressing the emery wheel which shapes the tooth to the proper contour.

After two years' continuous service, the wear on a set of heavy high-speed manganese steel nest gears was recently measured. These gears had a 10-in. face and when new the thickness of the tooth at the pitch line was 0.684 in. At the conclusion of the two-year period, the tooth measured 0.601 in., the wear being 0.083 in. These gears are still in service after having more than earned their original cost, and barring accident they will be good for many years to come.

Manganese steel is now employed extensively in rolling-mill machinery; it has been found particularly suitable for pinions on heavy roughing and blooming mills. Other parts around steel mills now being made of manganese steel are pipe-drawing balls, chafing plates, sprockets, cams, draw chains, unloader chains, conveyor chains, buckets, screens, pulverizer hammers, dry and wet pan parts, crusher castings, coupling boxes, spindles and backing rolls.

#### MANGANESE STEEL FOUNDRY PRACTICE

For the production of manganese steel castings the shop practice is fundamentally similar to that of an ordinary steel foundry, but a number of factors not vital in ordinary work must be considered. Among other points, the shrinkage is 5/16 in. per foot as against 3/16 to 1/4 in. for ordinary steel. For this reason the founders frequently prefer to make their own patterns from drawings supplied by their customers. Where patterns are furnished, sometimes they have to be modified or rebuilt.

The distribution of the metal in the casting is also important, since the heat treatment and cooling produce stresses which must be taken care of. At times it is necessary to add metal to a casting temporarily to withstand shrinkage strains, such additions of metal being removed in the machine shop. Manganese steel, being comparatively expensive, must be used economically, for which reason designs or patterns occasionally have to be altered.

In making manganese steel, side-blow converters are commonly employed and the 80 per cent ferromanganese with which the steel is alloyed is melted in separate crucible furnaces. The melted alloy is placed in the bottom of the ladle and the converter metal is poured in on the top.

Manganese acts as a strong scavenger, removing the gases and impurities from the metal, leaving it condensed and homogeneous. Before the molds are poured, the ladles are allowed to stand for a time to permit the alloy to perform its function, after which the accumulation of slag is removed.

#### THE HEAT TREATMENT

The annealing process is particularly important. The temperatures and the time the work is allowed to remain in the furnace vary considerably, depending upon the nature of the piece; the temperature ranges from 1600 to 2200 deg. Fahr. and the time of annealing from 4 to 24 hr. The gates and risers of castings can be broken off as in malleable foundries. The cores are removed with pneumatic drills and the exterior surfaces are cleaned and trimmed by grinding.

Castings which are to be accurate are finished in the machine shop by grinding, much of the work

requiring special grinding equipment. Holes more than 1 1/4 in. in diameter are cored out of the casting and ground to size. When it is necessary to drill smaller holes or to cut threads, soft steel or wrought-iron inserts are set in the molds at the desired points, like chaplets, and the metal is cast around them. Except in small holes, inserts or bushings are not necessary where keyways are cut, since these can now be ground successfully. Sometimes bushings are set in the hubs of wheels to be machined by ordinary methods.

The foreman continually exercises his judgment as to the wheels and cuts to be employed; coarse wheels and heavy cuts are used for removing stock rapidly, though it is never accomplished as easily as would be the case were it possible to use ordinary cutting tools.

#### Portable Flexible Grinding Machine

An adjustable grinding machine equipped with a flexible shaft has been placed on the market by Stow Mfg. Company, Binghamton, N. Y. It is designed especially for the steel industry and allied trades, and the whole combination is mounted on a truck enabling the



A Grinding Machine Equipped with a Flexible Shaft and Mounted on a Truck for Transportation to any Part of the Shop

tool to be transported to any part of the shop and eliminating the necessity of taking the work to the tool.

The motor is entirely inclosed with the starting equipment incorporated within the frame, thus giving a compact construction. The motor is either of the direct or alternating current type, and in the case of the former the speed variation is secured by a plunger in the pole piece, which operates to change the reluctance of the magnetic circuit, but no speed variation is possible with the alternating-current motor. The variation of the speed in the direct-current motor, it is pointed out, enables worn emery wheels to be used down to the minimum diameter consistent with safety. The motor is balanced on the truck so that it may be adjusted to any angle to meet all the grinding conditions. The weight of the flexible shaft is taken off the operator by the extension from the motor. The machine may be used on either small or large castings as it is possible for the operator to work over a large area, and if desired the emery wheel on the end of the shaft can be interchanged with a scratch brush should the work require it. Several sizes of the machine are built according to the capacity of the machine to accommodate different emery wheels.

The Ward Nail Company, Struthers, Ohio, has increased its capital stock from \$50,000 to \$100,000 in order to add additional equipment and increase its output.



# Net Incomes of Industrial Corporations

Statistics by Vice-Chairman Hurley of the Federal Trade Commission Are Surprising—Functions of Commission—Industrial Preparedness Urged

In an address before the annual meeting of the Association of National Advertisers in New York, Dec. 1, Edward N. Hurley, vice-chairman of the Federal Trade Commission, made public some striking figures evolved by the commission's study of the size and condition of American business units. Of 250,000 industrial corporations, over 100,000, or 40 per cent, have no net incomes. Mr. Hurley gave a résumé of what the commission hopes to achieve through the compilation of manufacturing and business data, and by the indorsement of standard methods of bookkeeping and cost accounting, possibly assisting in the devising of such systems. The commission, he pointed out, has no power and no desire to use compulsory methods. He closed with a plea for industrial preparedness, a mobilization of industries which will enable manufacturers to face competition after the close of the war in both the domestic and foreign markets. In part Mr. Hurley said:

The Federal Trade Commission is desirous of being helpful to business to the extent of the powers granted by Congress. In the different problems that are being submitted to us we find the business men anxious to present the facts, with the hope that they can be shown the right road to take to expand and develop their industries within the law.

One of the ways in which the Federal Trade Commission may help business is to gather, collect and make known the essential data regarding business. A friendly survey of the field of industry, with attention to industries in which conditions are not right, will be of great value. Just the simple statistics regarding business, never previously collected, are of immense importance, and when compiled and distributed to business men will be a most useful guide for their future action. The commission has now under way the preparation of figures showing the size of our various business units. While this work is not yet completed, some significant items are beginning to appear.

## FIGURES OF NET INCOMES AND SALES

Leaving out of consideration the banking, railroad and public-utilities corporations, and referring only to those that have to do with trade and industry, we find that there are about 250,000 business corporations in the country. The astonishing thing is that over 100,000 have no net income whatever. In addition, 90,000 make less than \$5,000 a year, while only the 60,000 remaining, the more successful ones, make \$5,000 a year and over.

Turning now from net income to the total volume of business done by those 60,000 corporations, we find that 20,000 have sales of less than \$100,000; 20,000 sell from \$100,000 to \$250,000; 10,000 from \$250,000 to \$500,000; 5000 ship annually half a million to a million dollars' worth of goods; 4500 have total sales from a million to five million dollars; while only 462 industrial and mercantile corporations in the United States do an annual business of \$5,000,000 or more.

These striking figures exhibit a condition which has existed for many years. They show conclusively that big business, while important, constitutes but a small fraction of the trade and industry of the United States. They make clear that there is an unduly large proportion of unsuccessful business concerns. Do they not need help? Why have we not paid more attention to small and middle-sized business? Is it not worthy of our consideration? What measures are we to take to improve these conditions?

Speaking generally, the real, constructive help must come from within. You know and I know that, lumping all business together, the real need is for better business methods. When we were all working on a large percentage of profit, and when it was a case of filling

orders at our own price, we didn't need any help. But that day is past. We now have to get down to the hard facts of business, to learn precisely what they are, where the weaknesses and losses exist, and practise the same thoroughness which characterizes trade and industry in Europe. We need to study standard systems of bookkeeping and cost accounting.

## COST ACCOUNTING A NECESSITY

A manufacturer who does not know with a close degree of accuracy what it costs him to produce the different articles he manufactures and what it costs him to sell them is not in a position intelligently to meet competition, and invites business disaster. Many of the larger manufacturers have thorough cost accounting systems, which they recognize as necessary in order to give them the information essential to successful management. On the other hand, the number of smaller manufacturers who have no adequate cost accounting system and who price their goods arbitrarily is amazing.

Proper accounting for the smaller manufacturer is most essential. It is necessary for his success that he know on what particular article he is making a fair profit and on what he is making only a narrow margin of profit or losing money. If he has this information he can concentrate on the manufacture and sale of the product on which the profits are satisfactory. Whole industries, in many instances, are suffering from a general lack of intelligent knowledge of cost.

The commission has no power and no desire to use compulsory methods. But it does hope to reach the desired end by indorsing standard systems of bookkeeping and cost accounting, and to assist in devising standard systems, either at the request of individual merchants and manufacturers or through the association that represents the industry. The commission expects to have for this work an adequate force of experienced accountants and cost experts and the service, in an advisory capacity, of public accountants of national reputation. What may be expected from such activities of the Federal Trade Commission?

## OBJECTS TO BE ACHIEVED

First, the individual enterprises will be helped. They will be enabled to know exactly where they stand. Their prices will be made on a solid basis of fact.

Second, the employees of these firms will be benefited. They will be trained to more thorough and more accurate methods of work. This improved knowledge will increase their effectiveness and their individual value to their employers.

Third, the investor will be benefited. He will be able to invest his money with greater assurance that it will be used in the most advantageous manner.

Fourth, the public will benefit. It will not have to pay for inefficient methods.

To take a specific example, suppose there are five plants making a certain line. Imagine that one of these plants is run efficiently and that the other four are managed in a slipshod manner. Where is the sort of trouble going to appear that costs the public and the trade heavily? In the four plants run in slovenly manner, of course. It is in those four plants that the expensive strikes will occur, the dangerous dissatisfaction among workers will appear, and the demoralizing practice of selling below cost of manufacture will take root and other unfair methods of competition as a means of making sales.

## WILL PROMOTE CREDIT AT BANKS

If we can raise the level of effectiveness prevailing in these four plants to the level prevailing at the ably

managed plant, or even higher, benefits will accrue to every interest concerned. All five of the plants will be on a more satisfactory competitive basis. The employees in at least four of the plants will learn to do their work to better purpose. Consumers will be forced to pay for fewer inefficient methods. The jobbers and retailers will get their goods under more advantageous conditions. And the bankers will have five excellent accounts on their books instead of one excellent and four doubtful ones.

An up-to-date system of accounting will enable the banker to extend to the smaller manufacturer the credit to which he is entitled and which he needs in order to expand his business. The small manufacturer may have just as much brains, ability, knowledge of his wares and of his customers as the larger operator; he may even put out a superior product. But he can not show the banker a balance sheet based on proper accounting methods, and the banker does not feel ready to extend credit without the knowledge that such a balance sheet would supply; thus, because business men of this type can not give statements about their business affairs in the exact manner necessarily required by the bankers, their credit is restricted and their expansion checked.

There should be a greater degree of organization and of mutual helpfulness in all lines of trade and industry, so that American business may be welded into a commercial and industrial whole, the part of the Government being to co-operate with business men, on request, to bring about the results that will benefit business and hence promote our national welfare.

#### IMPORTANCE OF TRADE ASSOCIATIONS

One of the most effective forms of organization is the trade association. The association has a wide field of useful and proper activities. Concerns in the same industry may take common action looking toward improving their processes of manufacture, standardizing their product, improving their system of ascertaining costs, obtaining credit information and encouraging the development of trade journals. The welfare of employees is one of the important matters which can be best developed by co-operating in associations. The present tendency of the larger firms to think of the smaller man in the proper spirit and to assist him in arriving at some practical method of ascertaining his costs and meeting his many other problems—in short, to live and let live—is to be particularly commended.

So to-day the associations of manufacturers, associations of jobbers, associations of merchants, associations of advertisers, are doing good work, and if conducted in a spirit of mutual helpfulness, with the machinery of the Government standing by subject to call, will help solve problems and remove many of the present handicaps of business.

#### FEARS FOR EXPORT TRADE

Another respect in which business may help itself is in the field of foreign trade. Heretofore the American business man, whether manufacturer or otherwise, has been prone to show an interest in foreign trade only during dull periods. Now that business has improved and factories are running full time in this country, I am afraid there is a growing feeling of indifference toward opportunities ahead. The theory has been advanced that it will require years for the countries now at war to resume their normal rate of production, and that the business is bound to come to us anyhow. This is a serious mistake. It was only a few months after the Franco-Prussian war when France was producing almost as much as before. She did not recover her normal purchasing power for twelve years, but this was due to the heavy indemnity Germany laid upon her.

The American manufacturer should realize that not a smokestack has been destroyed during this war in England, Germany, or Italy, and only a few in a small part of France. Unless we take advantage of the great opportunity we now have we will find that ninety days after the war is over Germany, France and England, and other European nations, will be on their way to a

position in the markets of the world even stronger than they occupied before.

#### COMBINED MARKETS MOST STABLE

True business preparedness demands that every American manufacturer who makes a product that can be sold abroad should aim to sell from 10 to 20 per cent of his output to foreign consumers. A market which includes both foreign and domestic business stabilizes industry and insures the manufacturer, his employees, and the country against the worst effects of financial and commercial depressions.

Business men are not lawyers, and, naturally, their thoughts running in other channels, they evolve some strange ideas as to the construction of certain laws. I was recently astonished to learn that the belief exists among many of them that non-competing firms cannot co-operate and form selling agencies to develop foreign business. This idea is unfortunate, and I fear that it has resulted in actually restraining the development of our commerce abroad. And I might mention, by the way, that such commerce can now be more easily developed, since for the first time in our history we have begun to establish our own banks abroad, thus removing many of the difficulties surrounding foreign exchange and credit information. With American branch banks established in South America and projected in the Far East, there is no reason why our business expansion should halt.

#### DANGERS MUST NOT BE MINIMIZED

The great war has brought to us great opportunities and equally great dangers. The thought that we must keep in mind is "After the war, what?" Shall we grow and expand while the growing is good, or calmly wait the time when peace in Europe will be followed immediately by fierce competition not only in foreign markets but in our domestic market as well? Have we an inventory of our business resources? Are they being developed to the best advantage? Are our associations doing all they can? Are our methods and processes standardized? In short, are our industries mobilized?

#### Philadelphia Foundrymen's Association

Nominations for officers to serve for the coming year were made at the Philadelphia Foundrymen's Association's monthly meeting at the Manufacturers' Club, Wednesday evening, Dec. 1. The nominating committee was composed of G. C. Davies, C. D. Matthews and W. H. Dunning. It presented the names of the present officers for re-election for 1916, as follows: President, Thomas Devlin, Thomas Devlin Mfg. Company; vice-president, A. A. Miller; treasurer, Josiah Thompson, J. Thompson & Co.; secretary, Howard Evans, J. W. Paxson Co.; executive committee, Walter Wood, R. D. Wood & Co.; Thomas M. Eynon, Eynon Evans Mfg. Company; H. L. Haldeman, Pulaski Iron Company; Walter T. McDonald, Schaum & Uhlinger; Walter S. Bickley, Penn Machine & Casting Company, Chester, Pa. Trustees, Thomas Devlin, Josiah Thompson and Howard Evans. Official chemist, George C. Davis. The formal election of officers will be held at the January meeting.

The subject for discussion following the business session was the use of the Snyder electric furnace for the melting of steel and iron and other metals. The paper, which was presented by Frederick T. Snyder, president of the Snyder Electric Furnace Company, Chicago, was illustrated by numerous lantern slides and the speaker covered the subject in an interesting manner along the lines of the recent articles describing this furnace and practice, which have appeared in THE IRON AGE.

The Crompton Knowles Loom works, Philadelphia, was elected to membership.

Announcement is made that the plant of the Chester Steel Casting Company, Seventh and Broomall streets, Chester, Pa., which has been idle for about two years, will begin operations this week. Peter J. McEntee is superintendent.



## JAMES MAPES DODGE

### Death of a National Figure in Engineering, Invention and Humanizing of Manufacturing

James Mapes Dodge, chairman of the board of the Link-Belt Company, died late Saturday night, Dec. 4, at his home on McKean Avenue, Germantown, Philadelphia, following an attack of pneumonia. He had been taken ill while returning from a visit to the Panama Pacific Exposition and had to be removed from the train at Chicago. He recovered sufficiently to resume the journey to Philadelphia but became seriously ill on his arrival there.

He was born at Waverly, N. J., June 30, 1852, a son of William and Mary Dodge, his father a member of the New York bar and his mother, whose maiden name was Mapes, being widely known as a writer and the editor of *St. Nicholas Magazine*. James Mapes Dodge was educated at the Newark Academy, at Newark, N. J., and subsequently studied at Cornell University and Rutgers College.

He served an apprenticeship with John Roach & Sons, shipbuilders, at their plants at Chester, Pa., and in New York, and in 1876 he entered into partnership with E. T. Copeland of New York to manufacture mining machinery. Two years later, when the firm dissolved, he became identified with the Ewart Mfg. Company, Chicago, and for two years he was superintendent of the Indianapolis Malleable Iron Company, developing the manufacture of the Ewart link belt. In 1884 the firm of Burr & Dodge was formed in Philadelphia, which later merged with the Link-Belt Engineering Company of Nicetown, Philadelphia, out of which grew the Link-Belt Company, of which he was the chairman of the board of directors.

Mr. Dodge was widely known because of his inventions of conveying machinery, his writings and his espousal of the cause of scientific management, but the better to tell this *THE IRON AGE* is able to append below a tribute from Dr. William Kent, a contemporaneous worker in parallel fields.

The Philadelphia press considers that few Philadelphians have been more interested in civic affairs than Mr. Dodge during the last thirty years. He was formerly president of the Public Service Committee of One Hundred of that city, and was a member of the Committee of Seventy. He was a member of the Union League, Corinthian Yacht Club, Germantown Cricket Club and the Engineers' Club of New York. In 1892 he became a life member of the Franklin Institute, being elected vice-president in 1903. He was a member of the board of managers and first vice-president of the institute, as well as being a member of several committees.

He was conspicuous in the affairs of the American Society of Mechanical Engineers which he joined in 1884. He served as one of the managers from 1891 to 1894; he was elected vice-president in 1900 and became president in 1902. At the time

of his death he was the chairman of the subcommittee on administration and a member of the committee on public relations. He was the first president of the Society to Promote the Science of Management.

He is survived by his wife, a daughter and two sons, Kern Dodge, a consulting engineer, Philadelphia, and Karl Dodge of Chicago.

### Tribute of Dr. William Kent

The writer's acquaintance with Mr. Dodge dates back to the Atlantic City meeting of the American Society of Mechanical Engineers in 1885. He there showed one of his rare qualities, that of making hosts of friends by his inexhaustible fund of wit and humor and by his geniality. He was a young man then, but we soon afterward heard of him as an energetic business man and as an inventor. He was a pioneer in the arts of hoisting and conveying and of coal storage. He developed the Ewart detachable-link chain into the link-belt with its numerous modifications and later took up the Renold silent chain and made a great business out of it.

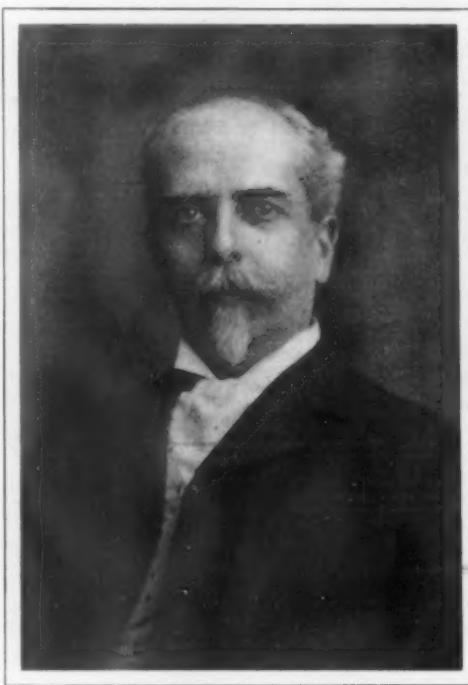
We next heard of him as a student of human nature and of the "money value of an education." In his office one day many years ago he showed the writer his card index system of recording the progress of his workmen. Beginning with a statement of the man's qualities and past history when he entered the works, he obtained from the foreman periodically statistics as to his steadiness, faithfulness and advances in capacity and in earnings. "Now," said he, "if a foreman complains to me about a workman, I pull out the man's card and show that for so many years he has had a clean record, not a black mark against it, and ask the foreman why, if the man is

as bad as he is said to be, it has never been found out before." He was bound that the workman should not suffer from injustice or prejudice.

The result of these labors in behalf of workmen and of apprentices appeared in his testimony before the United States Commission on Industrial Relations, in 1914, when he said, "My personal relations with my employees come near to the point where they call me Jim instead of Mr. Dodge, and my door is always open to them."

Mr. Dodge was the first manufacturer to adopt in its entirety the Taylor system of shop management, and it has now been running in the Philadelphia plant of the Link-Belt Company over seven years. After it had proved entirely successful there it was adopted with equal success in the company's two factories in Chicago and one in Indianapolis.

Mr. Dodge made many contributions to the literature of scientific management, and it is to be hoped that they may be collected together and published in book form. In his paper at the Dartmouth Conference on Scientific Management in 1911, he showed that his chief interest was in behalf of the workman. He said, "It is essential that the workman should be told the exact truth, and under



JAMES MAPES DODGE



no circumstances should anything be done that even slightly smacks of taking advantage of them. The whole scheme is one of mutual advancement and the corner stone of the art of management is truth, the abutments must be truth, and every stone in the structure must be truth." His paper presented at the joint meeting of the German Society of Engineers and the American Society of Mechanical Engineers in Leipsic in 1913 showed clearly the advantage that labor would reap from scientific management. In a lecture delivered in Philadelphia in December, 1913 (*Industrial Engineering*, January, 1914), he spoke in a similar strain, saying, "The labor organizations will realize that their greatest gain and that of all their members will come through proper management and mutual co-operation between the workmen and the boss. I therefore have no hesitation in saying that scientific management has proved to be *progressive* in every way and as its progress is entirely dependent upon its truth, and as truth is mighty and must prevail, it is, therefore, both *progressive* and *irreversible*."

The engineering profession has sustained a great loss in the death of Mr. Dodge, but the American workmen have sustained a greater one, for he was their best friend. No man has done more to solve the modern problem of industrial unrest, not by his writings only, but far more by his personal influence and example, which will cause hundreds to follow in his footsteps. In his last public appearance, when he delivered a eulogy on his friend Mr. Taylor at the memorial meeting of the Society to promote the Science of Management, less than two months ago, his concluding words were, "We shall not look upon his like again." We who heard these words little thought that so soon we should have to apply them to James Dodge himself.

#### Awards at Panama-Pacific Exposition

The following is a list of some of the awards of medals and prizes and gold medals made at the Panama-Pacific International Exposition, which closed at San Francisco, Dec. 4; supplementing those already announced in these columns:

American Rolling Mill Company, Middletown, Ohio, grand prize for Armco Iron.  
 Armstrong Bros. Tool Company, Chicago, Ill., grand prize for tool holders and a medal of honor on the other products exhibited, which included ratchets, drop forged wrenches, clamps, lathe dogs, etc.  
 Armstrong Cork Company, Pittsburgh, Pa., grand prize for heat insulating materials, including insulating brick for industrial furnaces, ovens, boiler settings, kilns, etc.; high-pressure steam covering for high-pressure and superheated steam lines, etc., cork covering for drinking water systems, brine and ammonia lines and all cold pipes and corkboard for cold storage rooms.  
 Commonwealth Steel Company, Granite City, Ill., medal of honor for a display of open-hearth steel castings.  
 Conada Mfg. Company, Springfield, Ohio, medal of honor for boiler cleaning tools, valve reseating machines, automatic cut-off and non-return valves, multiple water strainers and grease extractors.  
 Croy Works, New Britain, Conn., medal of honor for bolts, hinges and other wrought steel products.  
 Franchouse Electric & Mfg. Company, East Pittsburgh, Pa., grand prize for 4000-hp., 650-volt direct-current electric locomotive; medal of honor for alternating and direct current industrial motors and control apparatus, precision instruments, Le Blanc condensers, motor-generator sets for moving picture machines and high-voltage oil switches; gold medal for steam turbines, alternating and direct current generators and railway motors, transformers, rectifiers, switchboards and accessories, mining locomotives and automobile starting, lighting and ignition systems and the gold medal for the most complete and attractive installation in the Palace of Transportation.  
 J. Williams & Co., Brooklyn, N. Y., medal of honor for drop forgings and drop forged tools.  
 Williams Tool Company, Erie, Pa., gold medal for pipe threading and cutting machinery.

#### Mechanical Engineers' Meeting

A general manager is to be engaged by the American Society of Mechanical Engineers. The move is announced as one looking to bring about active participation by every member of the society and, following a saving of \$26,000 which Secretary Calvin W. Rice reported, in the expenditures of the last year, the council of the society at a meeting on Dec. 7, preceding the annual meeting opening Wednesday morning, Dec. 8, voted that such an office should be created to strengthen the present staff. The annual meeting is in progress in the Engineering Societies Building and will come to a close on Friday. The president's address is noted elsewhere in this issue.

A proposed change to the constitution, looking to requiring that 1 per cent of the voting membership is needed to make independent nominations for officers, instead of the present number of twenty, aroused considerable discussion. One per cent at the present time would make it necessary for forty-five or fifty to collaborate on independent nominations, and it was thought this would be a step backward from the democratic control of the society. It was finally brought out that a scheme was under consideration to constitute the nominating committee with representatives from the different sections and the question was laid on the table.

A considerable part of the morning session was given over to a memorial session to Frederick Winslow Taylor. Henry R. Towne, chairman Yale & Towne Mfg. Company, and past president of the society, was chairman and delivered, as an ad interim report of the society's committee appointed to conduct the memorial meeting, a remarkable address. Addresses were also made by Henry L. Gantt and Rear-Admiral Goodrich, U.S.N.

The society accepted a committee report on standardization of special threads for fixtures and fittings and also voted that the council establish a standing committee on power plant apparatus.

#### Largest Cast Steel Locomotive Frame

A locomotive engine frame, believed to be the largest ever cast, has been made by the Union Steel Casting Company, Pittsburgh. It is of vanadium steel and made for the heavy Santa Fe type locomotives for the New York, Ontario & Western. They are 41 ft. 7 in. long and each one weighs 13,250 lb. There were 24 of these having the following average physical properties after annealing: Elastic limit, 47,000 lb. per square inch; tensile strength, 78,500 lb. per square inch; elongation in 2 in., 26 per cent; reduction of area, 49 per cent; elastic ratio, 59.8 per cent.

#### Iron Ore on Lake Erie Docks

The stocks of Lake Superior iron ore on Lake Erie docks Dec. 1 were 8,812,499 gross tons. This compares with 8,375,014 tons on the same date in 1914 and 9,250,500 tons on Dec. 1, 1913. The shipments from Lake Erie docks to furnace during the season of navigation just closed were slightly above 27,000,000 tons.

After being released from receivership, the Eberly & Orris Mfg. Company, Mechanicsburg, Pa., has been taken over by the stockholders, who at a meeting Nov. 27 elected directors as follows: D. W. Sunday, A. L. Brubaker, Elmer Snyder, John D. Faller, Elmer Cockley, Samuel Sunday and J. C. Lambert. Officers were then elected as follows: President, D. W. Sunday; vice-president and general manager, J. C. Lambert; secretary, Samuel Sunday; treasurer, A. L. Brubaker.

The Davis-Bournonville Company, Jersey City, N. J., has established a commercial welding and cutting department at 316 Penn Avenue, Pittsburgh, and has removed its sales offices in that city from 2930 Penn Avenue to the same address.

The National Association of Waste Material Dealers will hold its regular quarterly meeting at the Hotel Astor, New York, Dec. 15, at 2 p. m. The Metal Division will meet on the preceding day, also at 2 p. m.

ESTABLISHED 1855

# THE IRON AGE

EDITORS:

A. I. FINDLEY

GEO. W. COPE

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.*

Charles G. Phillips, *Vice-Pres.*

Fritz J. Frank, *Secretary*

M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh:  
Park Building. Boston: Equitable Building. Philadelphia:  
Real Estate Trust Building. Cleveland: New England Build-  
ing. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, \$5.00 per year;  
single copy, 20 cents; to Canada, \$7.50 per year; to other  
foreign countries, \$10.00 per year. Entered at the New York  
Post Office as Second-class Mail Matter.

## A Direct Tax on Iron and Steel

Manufacturers of pig iron and of "fabricated" iron and steel may well wonder why their products are selected by the President for the imposition of direct taxes calculated, according to his message to Congress, to yield a \$20,000,000 stop-gap in these times of deficits. Having stripped the pig-iron and steel industries of protection against the dumping of the Canadian and European product, and having actually started foreign pig iron and steel this way last year, it was certainly not to be expected that the Administration would give its "unshackling" program this particular turn. A good many pig-iron producers and some steel companies were writing their balances in red before the war broke out. Seeing that they produce that from which shells are made, they promptly come to mind now when Washington needs to capitalize politically some section of the country's war prosperity.

Two and a half years ago a special session of Congress was working overtime to relieve the people of high living costs, falsely said to be due to custom house tolls. Now the sugar tax is to go back, income taxes are to be increased and in imposing new burdens iron is picked on, a commodity in commonest use, apart from food and clothing. When demand is greater than supply, as at present, and prices are above the average, the iron and steel taxes would be passed along to the consumer. In times of close competition, as in 1913 and 1914, these taxes would only make the home producer's situation worse and aid the foreign producer in placing his surplus here.

Iron and steel manufacturers should bear their share of the taxation levied for national defense. But to impose a direct tax of \$20,000,000 on an industry which was especially the target for attack in the tariff act of 1913 is an injustice which it will not be easy to carry through.

In sending out the preliminary program for its third convention, to be held at New Orleans in January, the National Foreign Trade Council says:

The program is based on *acceptance* of proved principles of foreign trade, such as the necessity of adequate banking facilities and transportation, adaptation of product and sales methods to market, proper packing, knowledge of foreign tariffs, and the helpful relation of investment to export trade; therefore, prepared papers and discussion will relate to *practical applica-*

*tion* of these principles, rather than their *reiteration*

A most apposite and refreshing admonition. Reams of good paper have been used up by the purveyors of foreign trade wisdom in going backward and forward in endless repetition of the rigmarole about banking facilities, proper packing, familiarity with the language, making the product suit the customer instead of the seller—and all the rest. From the standpoint of some of these voluminous experts the great drawback about actually getting export trade is that the business of just talking about preliminaries will be gone. The promoters of the New Orleans convention have properly set out to deal with actualities and to prevent the wearisome iteration of first principles.

## The Ton in Trade Usage

The United States Geological Survey has issued a brochure entitled "The Production of Metals and Ores in 1913 and 1914," by J. P. Dunlop. The author here gives in concentrated form the statistics of the production of all kinds of metals and ores in this country in the two years named, thus furnishing these statistics in convenient form for reference. It is a piece of work which will be appreciated by many persons who desire to keep themselves informed as to the development in the country of the metallurgical industry.

In looking over the tables, those who are familiar with the terms employed in the iron trade will be surprised to find that the statistics giving the production of pig iron are presented in "short" tons. They will further be surprised in finding that the statistics giving the production of iron ore are presented in "short" tons. In seeking for the reason for using "short" tons, it is found that the author makes the following explanation:

In the detailed chapters on the various metals Part I of Mineral Resources of the United States (which the reader should refer for full information the metallic resources and industries) the production is measured in terms of the customary unit, whether long ton of 2240 lb., the metric ton of 2204.6 lb., short ton of 2000 lb., the "flask" of 75 lb., the avoirdupois pound, or the troy ounce. The long ton is used for iron ore, bauxite, pig iron, and steel, particularly in the Eastern States, and for tin, copper, and spelter in England. The metric ton is used on the Continent of Europe, in Mexico, and wherever the metric system is in vogue. The "flask" is the customary unit for measurement of quicksilver except where the metric

ton is used; the avoirdupois pound is the unit referred to in defining the tons and the "flask," and is also used for measuring the output of copper, lead, spelter, aluminum, nickel, and so on; the short ton is used for both ore and concentrates in the West, as well as for lead and spelter; and the troy ounce is used for gold, silver, and platinum and allied rare metals. Were the metric system in commercial use in the United States, this confusion of terms would be avoided; in its absence the production of this country by metal mines and metallurgical plants is summarized, as stated, in terms of the short ton of 2000 lb.

In his endeavor to avoid "confusion of terms" in making his summaries, Mr. Dunlop introduces worse confusion in the minds of his readers by incorporating in these summaries statistics in "short" tons which are therefore so widely different from the figures in gross tons to which the trade has been accustomed. Thus the reader who glances at the summary showing the production of various metals in 1914 is struck by the fact that the production of pig iron in that year is placed at a total of 24,934,854 tons, whereas the figures which have been impressed upon his mind by the statistical authorities of the trade are much smaller. It is true that the figures in gross tons are presented in accompanying text. This, however, does not excuse the insertion of a totally different set of figures in the tables. If the author presumed that his readers wished to make a comparison as to quantities of the production of pig iron with that of nickel, aluminum, copper, lead, zinc, etc., the figures for the non-ferrous metals are so vastly under those for pig iron that it would appear wholly unnecessary to make this conversion into net tons. This constitutes a serious blemish on a publication that should be of permanent reference value.

It will be observed that the above extract from Mr. Dunlop's brochure states that "the long ton is used for iron ore, bauxite, pig iron and steel, particularly in the Eastern States, and for tin, copper and spelter in England." This indicates that the author is not as familiar with the practices of the trade as he should be. The "long" ton is not "particularly used" in the Eastern States for iron ore and pig iron, but is universally applied to those commodities throughout the country. From the beginning of the mining of iron ore in the Lake Superior region such ore has been sold by the gross ton, and the statistics of the trade have always been kept in gross tons. This region is so far from the Atlantic coast that it can hardly be considered to lie in the Eastern States.

The discussion of this matter brings up the question as to why the United States Geological Survey uses in its literature the expressions "short" tons and "long" tons. These expressions are not trade terms. They indicate a weight not commercially known. The ton of 2000 lb. is invariably known in the trade as the net ton and that of 2240 lb. is likewise invariably known as the gross ton. To use the expression "short" ton would appear to indicate that the ton thus referred to is not up to the standard in some respect; that it falls below what a ton should be. The word "net" bears no such reflection on the weight, but simply means a particular kind of ton. The Geological Survey has thus introduced another element of "confusion" in the terms employed in dealing with metallurgical statistics.

## Buyers' Co-operation in Strikes

Illustration of the growing unity among manufacturers in the protection of mutual interests, even when co-operation may mean monetary loss, is afforded by recent experiences in the machinery trade. The outcome is a matter of no little gratification to makers and dealers in machine tools who were affected by strikes. In the uncertainty which followed the outbreak of labor troubles in machine shops, both the builders of tools and their selling agents were greatly concerned as to what their customers would do when they learned that deliveries would have to be deferred. First-hand knowledge of the way purchasers had fought to secure the deliveries which, in the light of later events, could not be met tended in no wise to relieve the minds of the sellers.

But when the situation was frankly explained and the buyers' indulgence was asked there was practically no talk of canceling orders, and this despite the fact that the delay was indefinite, meant disappointment and actual loss through the limitation of output on remunerative contracts. Most of the buyers expressed the hope that the tool builders would stand firm. Some went so far as to say they would only think of canceling if the builders surrendered to the striking machinists. With all that is said, and truly, of the multiplication of manufacturers' associations, experiences such as these emphasize strikingly the extent to which the association movement has fostered co-operation and the spirit of give and take.

## Standard Open Hearth vs. Duplexing

The extensions to steel-making capacity recently authorized in the Chicago district present an interesting contrast between the installation of the duplexing process and standard open-hearth practice. The Inland Steel Company will build six open-hearth furnaces and plans to charge scrap with hot metal from the blast furnace according to standard practice. The Illinois Steel Company, at its Gary and South works, is to build duplexing plants. The existence of a Bessemer converter installation at South works suggests the advantageous adoption of duplexing, but this circumstance is scarcely more than incidental when considered in the light of the future plans at these works. These provide for the ultimate completion of the plant now authorized by the building of a group of four additional furnaces of the same type, increasing the capacity by the duplex process from a maximum of 60,000 tons monthly, with two furnaces, to a maximum of 180,000 tons. On the basis of 180,000 tons of steel made by the duplex process, steel-making in the other open hearths will become the supplementary operation, and the duplexing capacity proposed will also overshadow the present supply of converter metal.

At South works particularly, and also at Gary, on the completion of two additional blast furnaces, an ample production of hot metal will be available. South works has in the past been furnishing pig iron both to Gary and Joliet at times of maximum demand in its own works. Here hot metal can be manufactured more cheaply than scrap can be bought and normally displaces scrap to as great an



extent as possible in the open-hearth mixture. The duplexing process is the ideal method of making steel exclusively from hot metal. Duplexing thus becomes the logical choice and in addition provides a considerable tonnage of low-phosphorus scrap for the existing open-hearth plants.

With the Inland Steel Company, on the contrary, the existing situation presents a shortage of blast-furnace capacity on the basis of supplying hot metal for 18 open-hearth furnaces using a scrap mixture. While temporarily cold metal may have to be purchased, the extension plans provide for an additional blast furnace in the near future and possibly a fourth at some later time; but these will be available only after a long construction period and a large outlay. In contrast with such a prospect in the matter of hot-metal supply, this company has the advantage of long established channels through which sufficient supplies of steel scrap are made available. The larger expenditures involved in the cost of blast furnace and duplexing plants, as compared with the standard open hearth, are accordingly rendered inadvisable, and in this instance the straight open-hearth practice is the reasonable choice. To this, the desirability of placing the new capacity in operation at the earliest possible date adds much weight.

### Steel Merger Plans Abandoned

Several of those whose names have been prominently connected with the purchase for the consolidation of several large independent steel companies have stated in the past week that there is no present prospect of such consolidation being put through. The Cambria Steel Company was commonly named as an important factor in the negotiations, the Youngstown Sheet & Tube Company was also included, and rumors connected the Lackawanna Steel Company, the Inland Steel Company and the Maryland Steel Company with the proposal. F. A. Vanderlip, president of the National City Bank, New York, who had been asked to take up the financing of the proposed combine, has indicated that the negotiations are off and it is intimated in New York financial circles that no further steel mergers are likely to grow out of them. The reason for the abandonment of the plans is said to be the very high valuations put on their stocks by the various steel companies. These high prices were entirely natural in view of the present boom in the steel trade, but they were not considered a safe basis for investment.

The large plans of William H. Donner for the New York State Steel Company property which he has acquired and his organization of the Donner Steel Company at Buffalo are given considerable significance in connection with the recent movements in the Cambria Steel Company organization. Philadelphia transactions in Cambria Steel Company stock in the past week have amounted to upward of 175,000 shares. It would appear that control of the property may be decided by these purchases and it is believed some important holdings have been disposed of at a good profit in recent sales on the Philadelphia exchange.

The Inland Steel Company, Chicago, has awarded the contract for its new 40-in. blooming mill to Mackintosh, Hemphill & Co., Pittsburgh, and has placed contracts for blooming-mill and structural-mill buildings, stripper house, gas house, billet yard, motor house, warehouse, scrap yard, soaking pit building, and trestle steelwork, involving about 4000 tons of steel.

### Lake Superior Iron Ore Shipments 46,318,804 Gross Tons in 1915

Most of the iron ore docks on Lake Superior and Lake Michigan finished loading ore in the last week in November. The November total of shipments by water was 4,445,129 gross tons, against 1,068,682 tons in November of last year, or four times as much, showing how great was the effort to get down every ton possible to meet the present insistent demand from blast furnaces. Since Dec. 1 a number of cargoes have been loaded at Two Harbors, Escanaba and Superior, making a total of 57,236 tons. The total for the season, as made from figures coming to THE IRON AGE from all the eleven shipping docks, is 46,318,804 gross tons. Shipments by ports for the season are given below and comparative figures for the three preceding years.

Iron Ore Shipments from Upper Lake Ports—Gross Tons				
	1915	1914	1913	1912
Escanaba .....	5,649,289	3,664,454	5,399,444	5,234,655
Marquette .....	3,099,589	1,755,726	3,137,617	3,296,761
Ashland .....	5,146,772	3,363,419	4,338,230	4,797,101
Two Harbors .....	8,642,942	5,610,262	10,075,718	9,370,969
Superior .....	8,342,793	11,309,748	13,788,343	14,240,714
Duluth .....	15,437,419	6,318,291	12,331,126	10,495,577
Total by lake.....	46,318,804	32,021,900	49,070,478	47,435,777
Total all rail.....		707,826	876,638	785,769
Total shipments.....		32,729,726	49,947,116	48,221,546

It will be seen that Duluth has regained the position of leadership it held in the years preceding the heavy movement of Steel Corporation ore under the Great Northern lease, all such ore having gone over the Superior, Wis., docks. Minnesota's percentage of the total water shipments is less than for several years, being 70 as against 73 in 1914 and 72 in 1913.

### Donner Steel Company Extensions at Buffalo

The Donner Steel Company is the name of the corporation under which the rehabilitated and expanded plant of what was the New York State Steel Company at Buffalo is to be operated. William H. Donner, who recently purchased the plant and who is president of the new company, so announced at a luncheon of the membership campaign committee of the Buffalo Chamber of Commerce on Dec. 4. The incorporation papers of the Donner Steel Company have been filed at Albany, showing a capitalization of \$5,000,000, of which amount \$2,500,000 is preferred stock and \$2,500,000 common stock.

Introduced by Frank B. Baird, Mr. Donner made a brief speech at the luncheon, in which he said that it was the intention of the new company to put the present blast furnace, three open-hearth furnaces and the blooming mill in operation at the earliest practicable date, which he expected would be about the middle of January. The plans of the company, he added, include the building at once of a second blast furnace, equipment for which had already been ordered, the building of ore docks 1200 ft. in length along the company's frontage on the Buffalo River and the installation of ore handling machinery. By-product coke ovens will also be built at an expenditure of \$1,500,000. The company's engineers are also working on the details of a finishing mill to be added to the plant, which is now confined to the production of blooms and billets. The improvements contemplated will involve an outlay of more than \$3,000,000.

It is understood that definite plans of the new company contemplate the building of a third blast furnace later.

Arrangements for ore transportation have been made by joining with M. A. Hanna & Co. in the placing of an order for a 9500-ton boat which will be operated by the two interests. The contract for the boat has been placed with the American Shipbuilding Company.

## LARGE MIDVALE ADDITIONS

## New Blast Furnace at Coatesville—Cuban Iron Ore Property Acquired

Announcement is made this week of important additional improvements authorized by the Midvale Steel & Ordnance Company. These include a 500-ton blast furnace at the Worth Brothers Company plant, Coatesville, Pa., with a capacity of 175,000 tons of pig iron per year, together with full ore yard and gas engine equipment of sufficient capacity for a fourth blast furnace which will probably be authorized early next year. Also to be built at Coatesville are 8-in., 12-in. and 15-in. bar mills, a steel tire department, a rolled steel wheel department, a machine shop and a forging department in which will be one 2500-ton hydraulic press, one 1500-ton hydraulic press and two draw benches. Important additions to the machine shop equipment at the Midvale plant at Nicetown, Philadelphia, have also been authorized. These will give an increased capacity, enabling the company to handle orders recently taken from the United States Government for heavy ordnance such as 14-in. and 16-in. guns 70 ft. in length. The total cost of the improvements just authorized will be about \$3,600,000.

Mention has already been made in these columns of the previous authorization of six 50-ton open-hearth furnaces with capacity of 180,000 tons of ingots per year, to be built at the Worth plant, also a blooming mill with capacity of 200,000 tons per year and two 750-kw. turbo generators to furnish power for these extensions. At the same time additions to the steel manufacturing and machine shop equipment at Midvale were authorized. The total of these previous appropriations was \$1,950,000 for Coatesville and \$430,000 for Nicetown, so that the total expenditure now authorized for all plants is about \$6,000,000.

It is also announced that the Midvale Steel & Ordnance Company has acquired all of the capital stock of the Buena Vista Iron Company, a corporation owning extensive ore deposits in Cuba, adjoining properties owned by the United States Steel Corporation and the Mayari deposits of the Pennsylvania Steel Company. It is estimated that this property contains 300,000,000 tons of merchantable iron ore. Charles F. Rand, president of the Spanish-American Iron Company, is also president of the Buena Vista Iron Company, and will continue in the management of the latter's property. The Buena Vista ore shows about 56 per cent metallic iron in the dried state, 4 per cent silicon, 1 per cent nickel, 0.018 per cent phosphorus and 0.15 per cent sulphur. The moisture content is about 3 per cent. The acquisition of this property will put the two steel making subsidiaries of the Midvale Steel & Ordnance Company in a strong position and enable the company to proceed with the extensive additions contemplated at Coatesville with the assurance of an adequate and economical supply of raw material. Only one blast furnace is now in operation at Coatesville. It is planned to put the second in blast before the end of the year.

## Laclede Steel Company Buys Alton Plant

The Laclede Steel Company, St. Louis, manufacturer of merchant steel bars and reinforcing bars, announced Monday, Dec. 6, that it had purchased the plant of the Alton Steel Hoop Company, Alton, Ill., which went into the hands of a receiver eighteen months ago and was sold under foreclosure proceedings to H. C. Fownes, Pittsburgh, representing bondholders. The plant cost about \$1,250,000 at the time it was built three years ago. It sold for \$625,000 at the foreclosure sale. The Laclede Company is believed to have paid an advance on this price. It is reported that the plant will be opened in January for the manufacture of steel billets and hoops.

## CONTENTS

Stock Keeping in Adding Machine Factory.....	1347
Cast Vanadium Steel Dies.....	1351
President's Proposed Tax on Iron and Steel.....	1352
High-Explosive Shell Marking Machine.....	1353
Coke Ovens Heated From Above.....	1354
A Rhyming Market Letter of 1910.....	1355
Redesigning Vertical Shrapnel Milling Machine.....	1355
Electric Welding as Developed to Date.....	1356
French Needs After the War.....	1359
Hydraulic Cartridge Case Heading Press.....	1360
Portable Electric Air Warmer and Blower.....	1360
Large Motor-Driven Superheated Steam Valves.....	1360
Science and Engineering.....	1361
Decreased Imports of Iron Ore.....	1361
Steel Corporation Accepts Compensation Act.....	1361
Manganese-Steel Castings for Mining.....	1362
Portable Flexible Grinding Machine.....	1365
Net Incomes of Industrial Corporations.....	1366
Philadelphia Foundrymen's Association.....	1367
James Mapes Dodge.....	1368
Awards at Panama-Pacific Exposition.....	1369
Mechanical Engineers' Meeting.....	1369
Largest Cast Steel Locomotive Frame.....	1369
Iron Ore on Lake Erie Docks.....	1369
A Direct Tax on Iron and Steel.....	1370
The Ton in Trade Usage.....	1370
Buyers' Co-operation in Strikes.....	1371
Standard Open Hearth vs. Duplexing.....	1371
Steel Merger Plans Abandoned.....	1372
Lake Superior Iron Ore Shipments 46,318,975 Gross Tons in 1915.....	1372
Donner Steel Company Extensions at Buffalo.....	1372
Large Midvale Additions.....	1373
Laclede Steel Company Buys Alton Plant.....	1373
A Time to Save High-Speed Steel Scrap.....	1373
Small Gain in Pig Iron.....	1374
Blast Furnace Notes.....	1375
Personal.....	1376
British Imports of Machine Tools Prohibited.....	1376
International Trade.....	1377
Obituary.....	1377
The Iron and Metal Markets.....	1378
Railroad Car Business.....	1391
Important Ruling on Scrap Iron.....	1391
Pittsburgh and Nearby Districts.....	1392
Foreign Trade Convention.....	1393
Decisions on Virginia Pig-Iron Rates.....	1393
Bids on Steel for War Ships.....	1394
New Labor Troubles in New England.....	1394
General Refractories Buys Silica Brick Plant.....	1394
Machinery Markets and News of the Works.....	1395
New Trade Publications.....	1402

## A Time to Save High-Speed Steel Scrap

Concerning the scarcity of high speed steels and on the economies forced upon users of such steels, H. W. Alden, of the Timken-Detroit Axle Company, Detroit, writes as follows: "We, as well as every other manufacturer who uses these high grade steels, are feeling the effects of this shortage. In all of our plants we are saving every short length of steel down to less than six inches. We are even saving the worn-out tools so that we may have them remelted and made into new tool stock. The cause of this great shortage of steels is not so much the actual shortage of steel or iron ore as it is the shortage of tungsten. Should the supply of this steel be exhausted manufacturing operations would have to be slowed down so that steels of lesser cutting value could be used, and big outputs would be greatly curtailed."

The Brandt Cashier Company, Watertown, Wis., manufacturing coin-handling devices, registers, etc., has booked orders in the last fortnight which insure a maximum capacity operation for at least six months. The working force has been increased 25 per cent, bringing it up to the highest number the company has ever employed. E. J. Brandt is general manager.

The National Tube Company's series of industrial motion picture films, illustrating the manufacture of National pipe from ore to finished product, will be shown before the Princeton Engineering Association at the Princeton Club, 121 East Twenty-first Street, New York, on the evening of Dec. 15.



## SMALL GAIN IN PIG IRON

## November Increase Only 400 Tons a Day

## More Furnaces Working with Difficulty—Gain of Eight in Active Stacks

Pig-iron production in the thirty days of November amounted to 3,037,308 gross tons, or 101,244 tons a day, against 3,125,491 tons in October, or 100,822 tons a day. The steel company furnaces could not keep up the pace they made in the usual October strain for high records. Some of them are working under difficulties and may be expected to go out soon for relining. The hard driving of the past six months is telling. Merchant furnaces made 27,962 tons a day last month, a gain of 735 tons over October, while the steel works furnaces fell off over 300 tons a day from the October rate. On Dec. 1 the 284 furnaces active represented a daily capacity of 103,033 tons, against 276 furnaces active Nov. 1, with a daily capacity, based on their performance in October, of 101,819 tons.

## DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from November, 1914, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel works	Merchant	Total
November, 1914	35,305	15,306	50,611
December	33,381	15,515	48,896
January, 1915	35,998	15,661	51,659
February	44,192	15,621	59,813
March	50,036	16,539	66,575
April	52,804	17,746	70,550
May	54,655	18,360	73,015
June	59,022	20,339	79,361
July	62,895	19,796	82,691
August	67,801	21,865	89,666
September	70,977	21,108	92,085
October	73,595	27,227	100,822
November	73,282	27,962	101,244

## OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in November and the three months preceding:

Monthly Pig-Iron Production—Gross Tons				
	Aug. (31 days)	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)
New York	196,426	190,449	195,852	186,758
New Jersey	6,800	6,232	3,703	6,022
Lehigh Valley	87,555	100,714	116,086	113,904
Schuylkill Valley	69,042	64,988	85,028	79,590
Lower Susquehanna and Lebanon Valley	31,966	35,294	56,702	54,557
Pittsburgh district	699,921	700,248	773,715	730,515
Shenango Valley	133,249	144,224	169,294	171,685
Western Pennsylvania	164,777	164,596	173,428	172,290
Maryland, Virginia and Kentucky	45,145	60,247	70,946	74,816
Wheeling district	112,294	114,031	116,763	114,798
Mahoning Valley	310,426	305,564	315,399	304,421
Central and Northern Ohio	224,222	214,452	240,979	246,826
Hocking Valley and Hanging Rock	25,904	33,072	47,648	41,548
Chicago district	406,508	436,794	450,978	433,184
Mich., Minn., Mo., Wis. and Col.	69,628	75,731	79,810	81,493
Alabama	180,559	190,676	212,733	211,127
Tennessee	15,225	15,249	16,427	13,774
Total	2,779,647	2,852,561	3,125,491	3,037,308

## PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in the figures below, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons						
—Pig, total production—			Spiegeleisen and ferromanganese			
1913	1914	1915	1913	1914	1915	
Jan.	1,981,560	1,261,430	1,115,944	15,633	17,325	18,041
Feb.	1,792,154	1,329,414	1,237,380	20,131	10,524	13,319
Mar.	1,904,878	1,704,688	1,551,082	20,546	20,133	12,274
Apr.	1,939,751	1,635,226	1,584,111	23,108	18,676	12,337
May	1,991,192	1,457,847	1,694,290	19,042	21,504	13,440
June	1,860,070	1,329,623	1,770,657	19,212	16,254	19,200
July	1,840,216	1,395,851	1,949,750	28,310	16,524	17,854
Aug.	1,833,352	1,455,054	2,101,818	20,680	11,577	27,463
Sept.	1,828,232	1,390,322	2,129,322	24,555	13,786	23,159
Oct.	1,848,634	1,271,820	2,281,456	19,499	17,435	23,992
Nov.	1,573,007	1,059,159	2,198,459	26,765	21,977	28,741
Dec.	1,298,262	1,034,802		14,095	20,733	

## CAPACITY IN BLAST DEC. 1 AND NOV. 1

The following table shows the daily capacity in gross tons of furnaces in blast Dec. 1 and Nov. 1 by districts:

Coke and Anthracite Furnaces in Blast					
Location of furnaces	Total number of stacks	Dec. 1		Nov. 1	
		Number in blast	Capacity per day	Number in blast	Capacity per day
<i>New York:</i>					
Buffalo	19	15	5,459	16	5,686
Other New York	7	3	646	3	632
New Jersey	7	1	201	1	119
<i>Pennsylvania:</i>					
Lehigh Valley	21	12	3,515	12	3,526
Spiegel	2	2	217	2	219
Schuylkill Val.	15	9	2,845	8	2,703
Lower Susquehanna	7	4	1,262	4	1,353
Lebanon Val.	10	4	650	3	556
Pittsburgh Dist.	52	49	23,977	50	24,866
Ferro	4	3	340	3	323
Shenango Val.	19	19	5,940	17	5,710
Western Pa.	23	16	5,594	16	5,539
Ferro	2	2	160	1	56
Maryland	3	2	1,060	2	854
Ferro	1	0	0	1	114
Wheeling Dist.	11	10	3,827	10	3,850
<i>Ohio:</i>					
Mahoning Val.	25	22	10,147	22	10,310
Central and Northern	24	20	8,270	18	7,765
Hocking Val. & Hanging Rock	15	10	1,591	9	1,410
Illinois and Ind.	35	29	14,471	29	14,486
Ferro	1	1	122	1	62
Michigan, Wis. & Minn.	11	9	2,475	7	1,971
Colo. and Mo.	7	2	742	2	752
<i>The South:</i>					
Virginia	24	7	964	7	925
Kentucky	5	3	605	3	622
Alabama	45	25	7,378	24	6,895
Ferro	1	1	80	0	0
Tennessee	20	5	495	5	515
Total	416	284	103,033	276	101,819

## DIAGRAM OF PIG-IRON PRODUCTION AND PRICES

The fluctuations in pig-iron production from January, 1908, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE. The figures for daily average production, beginning January, 1908, are as follows:

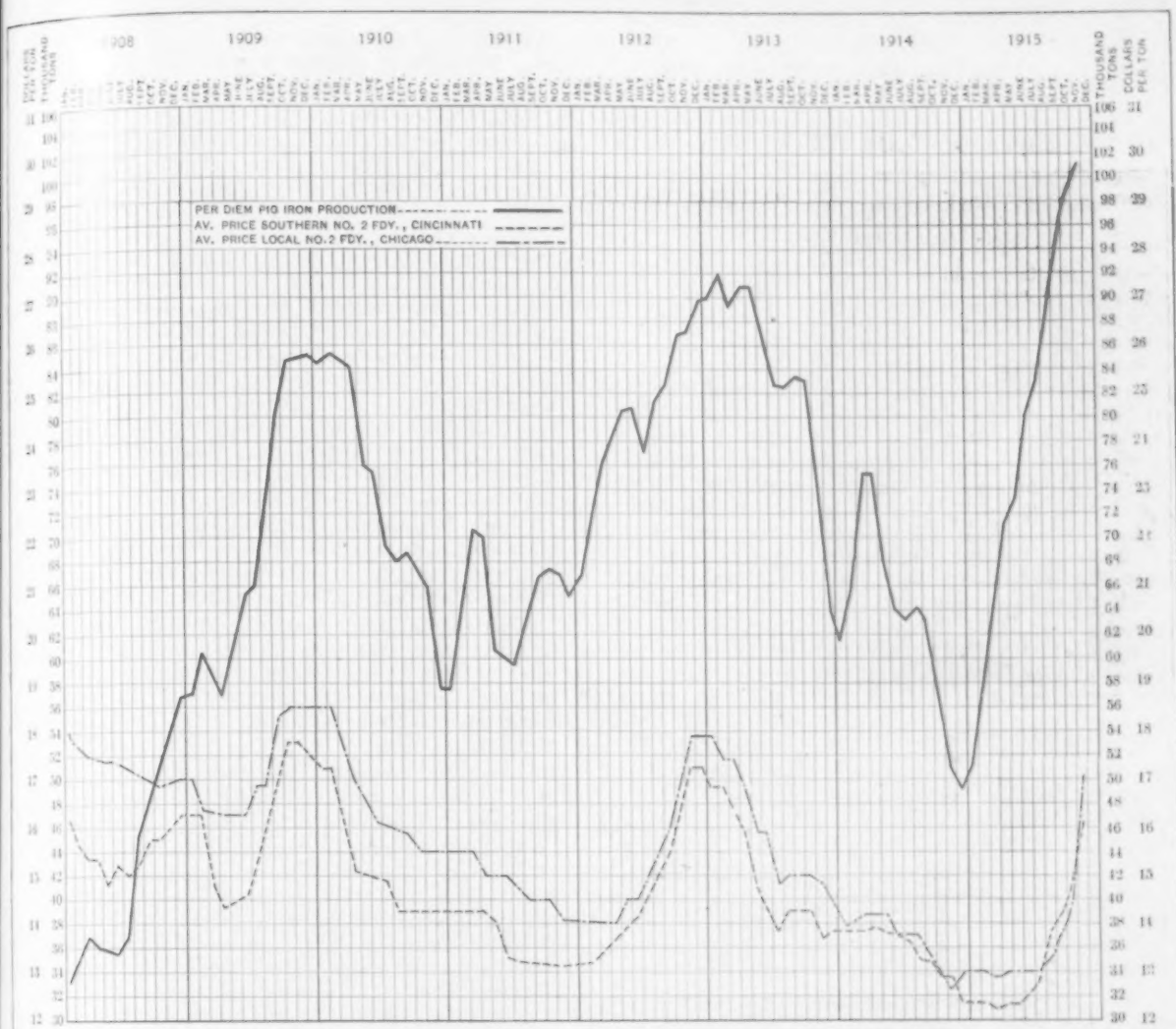
Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1908—Gross Tons												
	1908	1909	1910	1911	1912	1913	1914	1915				
Jan.	33,918	57,975	84,148	56,752	66,384	90,172	60,808	51,659				
Feb.	37,163	60,976	85,616	64,090	72,442	92,369	67,453	59,813				
Mar.	39,619	59,232	84,459	70,036	77,591	89,147	75,738	66,575				
Apr.	38,289	57,962	82,792	68,836	79,181	91,759	75,665	70,550				
May	37,603	60,753	77,102	61,079	81,051	91,039	67,506	73,015				
June	36,444	64,656	75,516	59,585	81,358	87,619	63,916	79,361				
July	39,287	67,793	69,305	57,841	77,738	82,601	63,150	82,691				
Aug.	42,851	72,546	67,963	62,150	81,046	82,057	64,363	89,666				
Sept.	47,300	79,507	68,476	65,903	82,128	83,531	62,753	95,085				
Oct.	50,554	83,856	67,520	67,811	86,722	82,133	57,361	100,822				
Nov.	51,595	84,917	63,659	66,648	87,697	74,453	50,611	101,244				
Dec.	56,158	85,022	57,349	65,912	89,766	63,987	48,896					

## THE RECORD OF PRODUCTION

Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1911—Gross Tons					
	1911	1912	1913	1914	1915
Jan.	1,759,326	2,057,911	2,795,331	1,885,054	1,601,421
Feb.	1,794,509	2,100,815	2,586,337	1,888,670	1,674,771
Mar.	2,171,111	2,405,318	2,763,563	2,347,867	2,063,834
Apr.	2,064,086	2,375,436	2,752,761	2,269,655	2,116,494
May	1,893,456	2,512,582	2,822,217	2,092,686	2,263,470
June	1,787,566	2,440,745	2,628,565	1,917,783	2,380,827
July	1,793,068	2,410,889	2,560,646	1,957,645	2,563,420
Aug.	1,926,637	2,512,431	2,545,763	1,995,261	2,779,647
Sept.	1,997,102	2,463,839	2,505,927	1,882,577	2,852,561
Oct.	2,102,147	2,689,933	2,546,261	1,778,186	3,125,491
Nov.	1,999,433	2,630,854	2,233,123	1,518,316	3,037,308
Dec.	2,043,270	2,782,737	1,983,607	1,515,752	
11 mo.	21,288,441	26,600,753	28,740,494	21,533,700	26,459,244
Total, yr.	23,331,711	29,383,490	30,724,101	23,049,752	

Furnaces blown in in November or on Dec. 1 include one Saucon in the Lehigh Valley, Temple in the Schuylkill Valley, one Colebrook in the Lebanon Valley, Fannie and Sharpville in the Shenango Valley, Rebecca in western Pennsylvania, one stack of the Maryland Steel Company, Franklin and Steelton in Ohio, Lawrence and Union in the Hanging Rock district,





### New High Mark in American Pig Iron Output—A Daily Rate of 101,244 Gross Tons

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from Jan. 1, 1908, to Dec. 1, 1915; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

one Calumet in the Chicago district, one Bay View in Wisconsin, one new furnace of the Minnesota Steel Company and one Pioneer, one Sloss and one Bessemer in Alabama.

The furnaces blown out last month were Harriet X (Wickwire) in New York, Crumwold in the Lehigh Valley, one Edgar Thomson in the Pittsburgh district, one stack of the Maryland Steel Company, Sarah in the Hanging Rock district, one Joliet in the Chicago district and Alabama City in Alabama.

### Blast Furnace Notes

The E. & G. Brooke Iron Company, Birdsboro, Pa., is dismantling its No. 2 blast furnace to make room for the new roll foundry of the Birdsboro Steel Foundry & Machine Company. Part of the new building will extend over a portion of the furnace site. The ownership of the foundry company and the furnace company is identical. The furnace was last operated in July, 1910, and had a capacity of 80 to 100 tons a day. It was 15 x 57 ft. and was built in 1871.

The American Manganese Mfg. Company has now completed the relining of its No. 2 furnace at Dunbar, Pa. For some time the No. 1 furnace has been producing 80 per cent ferromanganese exclusively.

It is expected that the second Bird Coleman furnace of the Lackawanna Iron & Steel Company at Cornwall, Pa., will be blown in late in December.

Sharpsville furnace, formerly owned by the Sharpsville Furnace Company at Sharpsville, Pa., recently taken over by the Allen S. Davison Company, Oliver Building, Pittsburgh, after being idle for several years, resumed blast on Wednesday, Dec. 1. It is making

Bessemer iron and is expected to turn out from 150 to 175 tons per day.

Orders have been issued by the Carnegie Steel Company to start up as soon as possible after Jan. 1, Edith and Neville Island furnaces in the Pittsburgh district. Both stacks have been idle over seven years, and the fact that they are being started now emphasizes strongly the company's need of more pig iron. On Dec. 1 the Carnegie Steel Company had fifty furnaces in blast and only eight idle. The idle stacks were Neville Island, Edith, Steubenville, Niles, two Edgar Thomson, one Bellaire which is being rebuilt, and Zanesville. The two Columbus, Ohio, furnaces were blown in in November. With the starting of Edith and Neville Island, the list of idle furnaces will be reduced to six, and of these, the two Edgar Thomson stacks, which are being relined and repaired, will be started as soon as ready, and Bellaire furnace, which is being rebuilt, will probably be ready for blast about March 1. Some records for output were made at various blast furnaces of the Carnegie Steel Company in November.

The Reading Iron Company blew out its Crumwold furnace at Emaus, Pa., Nov. 12.

The blast furnace of the Temple Iron Company, Reading, Pa., blew in Nov. 24.

The Maryland Steel Company, Sparrows Point, Md., on Nov. 15 blew out its No. 1 furnace, which had been producing ferromanganese, and blew in its No. 2 furnace Nov. 22 to make pig iron.

The Federal Furnace Company, Chicago, blew in its B furnace Dec. 4.

The Illinois Steel Company blew out the No. 3 furnace at its Joliet works Nov. 1, and on Nov. 10 blew in its No. 2 furnace at its Milwaukee works.

## PERSONAL



E. W. EDWARDS

E. W. Edwards, president Edwards Mfg. Company, of Cincinnati, Ohio, has been unanimously elected president of the Rapid Transit Commission of that city at a meeting held Monday, Nov. 29. This commission is composed of five members. Mr. Edwards was one of the members of the original commission and was re-appointed. His election as president is evidence of the high standing he holds in his community. Within the next two

years the commission will be called upon to direct the expenditure of \$8,000,000 to \$10,000,000 for the furthering of rapid transit in Cincinnati.

The directors of the newly organized Penn Marine & Ordnance Company, Chester, Pa., are Rodney Thayer, Harvey D. Gibson, J. E. Richards, I. S. Adams, C. Ferris Jemison, Lewis L. Dunham, Henry J. Fuller, Walter F. Bickley, Ernest DuPont and A. L. Corey.

W. L. Saunders, president Ingersoll-Rand Company, who is a member of the Naval Advisory Board, talked on "Preparedness" before the Board of Trade, Dunellen, N. J., at its annual banquet, Dec. 2.

John Stambaugh, treasurer Brier Hill Steel Company, Youngstown, Ohio, has been elected a director of the Federal Reserve Bank of Cleveland, Ohio, to serve for three years, filling the vacancy caused by the expiration of the term of A. B. Patrick, Saylerville, Ky.

John S. Holbrook, general manager, Gorham Mfg. Company, Providence, R. I., has been elected president of the Providence Chamber of Commerce. William A. Viall, Brown & Sharpe Mfg. Company, has been elected a director for two years.

Several changes have been made at Landers, Frary & Clark, New Britain, Conn. Henry Fagan, superintendent of the cutlery department, has been promoted to a new office—superintendent of construction. He is succeeded by his former assistant, Charles A. Lappan. Henry Deming becomes assistant superintendent of the cutlery department.

Arthur Prausnitz, associate manager of the San Francisco branch of the Orenstein-Arthur Koppel Company, has returned from a long visit to the Hawaiian Islands, where he placed a large amount of industrial railway equipment among the sugar plantations.

Frank E. Watkins, formerly associated with the Canadian Fairbanks-Morse Company, Ltd., Toronto, Ont., has been made works manager of the East Jersey Pipe Corporation, Paterson, N. J.

The firm of Corwin & Adams, consulting engineers, has been organized at Fond du Lac, Wis., by John Adams and L. A. Corwin, to engage in the general practice of steam and electric engineering and to represent several large manufacturers of power plant and steam appliances. Mr. Adams recently resigned as chief engineer of the Eastern Wisconsin Electric Railway & Light Company, Fond du Lac. He was formerly associated with the Westinghouse interests. Mr. Corwin until recently was chief engineer of the Harris

Typewriter Company, Fond du Lac, and previously with the Milwaukee Electric Railway & Light Company. The new firm will devote considerable attention to efficiency engineering.

The Pressed Steel Car Company, Pittsburgh, has made the following changes, effective Dec. 1: N. S. Reeder has been elected vice-president, with headquarters in New York City; J. B. Rider has been elected vice-president, with headquarters in Pittsburgh, and will continue to perform the duties of general manager, in charge of operations. J. F. MacEnulty, formerly general sales manager, has been elected second vice-president, with headquarters in New York City. C. E. Postlethwaite, formerly manager of sales, central district, Pittsburgh, has been appointed general sales manager of the Pressed Steel Car Company and the Western Steel Car & Foundry Company, with headquarters in New York City. H. P. Hoffstot has been appointed assistant sales manager, central district, with headquarters in Pittsburgh.

John Sohnhalter, formerly assistant metallurgist with the American Steel & Wire Company, Pittsburgh, has resigned to become metallurgist for the Page Woven Wire Fence Company, Monessen, Pa.

Harley A. Bate, formerly in charge of the heat treating and annealing department of the LaBelle works of the Crucible Steel Company, Pittsburgh, has resigned to become metallurgist of the research department of the American Rolling Mill Company, Middletown, Ohio.

Oliver G. Ricketson has been appointed vice-president of the A. Garrison Foundry Company, Pittsburgh, succeeding H. C. Shaw, deceased.

Edward N. Lake, formerly in charge of the Chicago office of the Stone & Webster Engineering Corporation, has become a partner in the Krehbiel Company, engineer and constructor, with offices in the Marquette Building, Chicago. The business will be continued under the present name. Mr. Lake will be treasurer and manager, and Mr. Krehbiel will continue as president. Mr. Krehbiel has specialized in fuel, steam and mechanical engineering and construction. Mr. Lake has made electricity and its commercial applications his specialty. The Krehbiel Company is doing in smaller units the same kind of work that Stone & Webster, H. M. Bylesby & Co. and J. G. White & Co. have done in terms of millions.

George D. Babcock, production manager H. H. Franklin Mfg. Company, Syracuse, N. Y., delivered an address before the University Industrial Society at Bridgeport, Conn., Dec. 3, on "Exact Control of Manufacture."

F. A. Kelly, formerly identified with the traffic department of the United States Steel Products Company, is now traffic manager for the American Steel Export Company, 165 Broadway, New York.

### British Imports of Machine Tools Prohibited

A cablegram from the American Embassy in London, dated Dec. 2, to *Commerce Reports*, indicates the prohibition of importations of machine tools. It states that a royal proclamation of Nov. 30 prohibits the importation, after Dec. 21, into the United Kingdom of all machine tools and parts thereof, except small tools. A further exception covers machine tools and parts thereof imported under the license of the Board of Trade and subject to the provisions and conditions of such license.

Glenn R. Sawyer and J. G. Simms have been appointed receivers for the Angldile Computing Scale Company, Elkhart, Ind. The company, which is capitalized at \$300,000, is believed to be solvent.

The Chattanooga Coal & Iron Corporation, C. E. Buek, president, blew in its furnace at Chattanooga, Tenn., Dec. 4.

The furnace of the Standard Iron Company at Goodrich, Tenn., was blown in Dec. 6.

## INTERNATIONAL TRADE

## New York Conference Discusses Merchant Marine and Export Problems

Means of creating an American merchant marine took up a large part of an afternoon's deliberations of the International Trade Conference held on Dec. 6, 7 and 8, at the Hotel Astor, New York, by the National Association of Manufacturers in co-operation with the banking and transportation interests of the United States. Bernard N. Baker, Baltimore, Md., in discussing "Legislation Necessary for a Merchant Marine," emphasized the menace to American trade in general of the unprecedented congested condition of the railroads entering New York, caused primarily by a ship shortage. Attention was called to the failure of Congress in the last thirty years to establish some kind of a merchant marine, while the ship registry act was praised and the La Follette act blamed. Mr. Baker advocated a Government shipping board of three, with the Secretaries of the Navy and of Commerce as members *ex officio*, and an appropriation by Congress of at least \$60,000,000 for the establishment of various lines.

Col. George Pope, president of the National Association of Manufacturers, introduced Robert W. Woolley, director of the United States Mint, who presented the Administration's side of the question as embodied in the bill for a naval auxiliary merchant marine, soon to be introduced into Congress, emphasizing the need of some relief by the statement that not less than 50,000 cars and millions of tons of merchandise are waiting for ships for transportation across the seas. William M. Douglass of New York, in a ringing speech, on "What the Business Men Desire and What the Country Needs," considered this question the greatest before the country, preparedness alone excepted. In his opinion the two questions go hand in hand; our great trade of to-day is really unprotected without a merchant marine and a great navy. A subsidy he believed to be the only real solution of the problem, calling attention to the fact that it costs now \$100 a ton to build a ship as compared with \$60 a ton before the war.

P. H. W. Ross, president of the National Marine League, one of the participants in a spirited discussion of the question, said that "bad as are the conditions as to congestion in the East, on the Pacific coast they are even worse."

Preparedness, especially from a railroad point of view, was also a feature of this session. George D. Dixon, vice-president of the Pennsylvania Railroad, Philadelphia, said:

If our railroads are ever called upon to assist in the nation's defense, what would it be worth to the American people to have allowed them the necessary funds for the needed double and quadruple tracking, extension of lines, modernizing of all equipment, and the enlargement of the terminal facilities necessary to prevent congestion? What would happen to America if its railroad transportation system broke down when called upon by the people of the country to aid in her defense?

Next, then, to an adequate army and navy, if not indeed of equal importance, is the condition of the railroads of the United States as a factor in national preparedness. Only railroads of the highest efficiency can truly unify the country and keep its resources of men, money and materials in a liquid and mobile state. As a military precaution, if for no other reason, it would be in the highest degree wise and profitable for the American people to see to it that their railroads have sufficient financial resources to be able to serve this end properly; and that the Federal and State governments accord them treatment which will insure their healthy growth at all times.

Dr. E. E. Pratt, chief of the U. S. Bureau of Foreign and Domestic Commerce, in discussing "The Making of an Export Policy," said that too much emphasis in recent months had been placed on possible export trade with South America. Important as this is, he considered the trade of China, South Africa, Australia, India and especially Russia to be of greater consequence. He called particular attention to the fact that our trade in June, July, August and September

this year, as compared with the same months in 1913, has increased 21.5 per cent with South America, 11 per cent with British South Africa, 51 per cent with Asia and 76.7 per cent with Australia, while with Central America it has remained stationary and with Canada has decreased 9 per cent. This new trade, it was expected, would be at least held. The various problems facing a manufacturer intending to engage in export trade, as well as the policy to be adopted, were thoroughly presented to the audience.

The afternoon session of Tuesday was devoted principally to the question of American banks for foreign trade. The conference as a whole was a pronounced success, the attendance, both registered and otherwise, being very large and the sustained interest significant.

## OBITUARY

BENJAMIN M. JONES, president B. M. Jones & Co., Inc., representing Samuel Osborn & Co., Sheffield, and Taylor Brothers & Co., Leeds, England, died at his home in Boston, Nov. 26, after a few hours' illness, aged 78 years. He early entered the metal importing business, and at the time of his death had maintained a continuous connection for nearly sixty years with Taylor Brothers & Co., Ltd., Leeds, England. In the early seventies, shortly after its invention, he introduced to the metal-working industries of this country and Canada the Mushet "self-hardening" steel. The innovations in machine shop practice brought about by this steel soon made his name well known to mechanical men throughout both countries. He was a member of the Players' Club, the New York Railroad Club and the New England Railroad Club, having served on the finance committee of the latter for many years.

MARSTON P. COCKEY died at his home in New York City, Nov. 29, aged about 51 years. At the time of his death he was sales manager of the John A. Roebling's Sons Company of New York. He had been connected with the company for twenty-five years, starting as salesman. He was born in New York City. Mr. Cockey was particularly well known in Masonic circles, having attained eminence in various bodies of that fraternity, rising to the thirty-third degree. He leaves his widow and three sons, one of whom, Edward C. Cockey, is a salesman in the employ of the same company.

HERBERT R. ELDRIDGE, vice-president National City Bank, New York, died suddenly near Potosi, Bolivia, Nov. 21, from heart failure, due to the high altitude, aged 45 years. Born in Decatur, Ill., he gained his business and banking experience in Texas, taking his New York position in 1913. His visit to South America was for the purpose of extending American financial and trade connections. He will be remembered as having addressed the convention of the National Machine Tool Builders' Association in New York City in October, 1914.

EDWARD SMITH, president American Shipbuilding Company and Buffalo Dry Dock Company, died at his home in Buffalo, N. Y., Dec. 5, aged 71 years. He had been ill only two weeks, and his condition had not been regarded as serious. Mr. Smith was born in Germany, but came to this country with his parents when he was 6 years old. In early life he was a ship chandler, and later became managing owner and partner in the brokerage concern of Brown & Co.

WILLIAM W. MITCHELL, Cadillac, Mich., died Nov. 8. He was president of Cobbs & Mitchell, Inc., Mitchell Brothers Company, Cadillac Handle Company, Cadillac Chemical Company and Mitchell-Diggins Iron Company.

COL. A. BOURLIER, president Louisville Cornice & Roofing Company, Louisville, Ky., died at his home in that city, Dec. 1, after a long illness, aged 74 years.



# The Iron and Metal Markets

## LAKE ORES UP 75 CENTS

### Mesaba Prices Practically Established

#### Small Gain in Production of Pig Iron, While Prices Go Higher

Transactions in Lake Superior iron ore are on the verge of closing which, it is believed, will establish a price of \$4.25 for Mesaba Bessemer and \$3.55 for Mesaba non-Bessemer ore, an advance of 80c. for the former and 70c. for the latter upon the prices of this year. Old-range ores, according to present indications will sell at an advance of about 75c. over the 1915 schedule instead of \$1, as favored by some producers.

As demand is expected for all the ore that can be got down in 1916 it is not improbable that sales later in the season will be at higher than opening prices.

The inability of some ore shippers to make season vessel charters for next year is a disturbing factor. A number of vessels have been bought outright and more orders for new boats would be placed, but deliveries cannot be had for 1916 trade. Vessel owners are now holding for more than the 10c.-advance paid by the Steel Corporation and the taking of 10,000,000 tons in outside charters by the latter has created a tense situation.

The difficulty of forcing pig-iron production above the present rate appears in the statistics for November. At 3,037,308 tons for last month, the output was 101,244 tons a day, against 3,125,491 tons in October, or 100,822 tons a day. The steel company furnaces could not keep up the pace they made in the October strain for high records. Some of them may be expected to go out soon for relining, as the hard driving of many months is telling.

On Dec. 1 the capacity of the 284 active blast furnaces was 103,033 tons a day, against 101,819 tons a day for 276 furnaces on Nov. 1, this last rate being based on the unusual outputs of October. Production is now at the rate of 38,000,000 tons a year, allowing 400,000 tons for charcoal pig iron.

The increase in ferromanganese output is marked. For the past five months it has averaged 24,200 tons against 14,700 tons in the first half of the year. But scarcity of boats has cut off Brazilian ores.

Pig-iron markets in the Central Western and Chicago districts are showing little restraint in their advances. At Chicago sales are numerous and are readily closed at rising prices. Ohio iron has gone up 50c. to \$1 a ton on no large buying, but on the great extent to which producers find their capacity taken up for the first half of the year.

In steel-making iron advances are readily made, Bessemer iron having sold at \$18.50 and \$19 at furnace, while basic has brought as high as \$18. For export \$20 has been offered for Bessemer.

The congestion of export shipments of steel adds to the troubles of home consumers. While mills are able to concentrate upon the relief of the domestic

situation, the scarcity of cars is an increasing handicap.

The offering of premiums of \$3 to \$8 a ton for billets, rods and some forms of finished material, particularly plates, brings out but little. Plate advances stand out, some mills having secured 2.25c. and 2.30c., Pittsburgh, on early deliveries. At Pittsburgh the principal advances of the week apart from pig iron are \$3 on bar iron, \$2 on light rails, \$2 on shafting and 50c. to \$1 on scrap. Chicago store prices are higher on sheets, shafting and bolts and nuts.

Contracts are still to be placed for 500,000 tons of shell bars for France, deliveries extending over 1916 and to be made without regard to the ending of the war.

New business in finished lines is naturally smaller in view of the unusual efforts steel users must make to secure satisfactory deliveries, but specifications grow heavier. Thus far the contracts for the second half of 1916 are not large, but some buyers are paying higher prices to get protection in that period.

This applies largely to car business. The Pennsylvania Railroad, in placing 2150 of the 11,000 cars which it withdrew from the market lately because of high prices, accepted deliveries after July 1. From 5000 to 6000 cars were bought in the week and more are pending including some good export business.

The Frisco rail order, amounting to 43,000 tons, goes to the Alabama mill. The Nickel Plate is inquiring for 5000 to 10,000 tons. Whether 60,000 to 70,000 tons of Russian rails are placed here in the next two weeks depends on the availability of vessel space, of which there is serious doubt.

Lake Superior ore shipments by water in the season just closed were 46,318,804 tons against 32,021,900 tons last year and 49,070,478 tons in the record year 1913. Estimates for next year range above 55,000,000 tons.

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Types, Declines in Italics

At date, one week, one month and one year previous

	Dec. 8, 1915.	Dec. 1, 1915.	Nov. 10, 1915.	Dec. 9, 1914.
<b>Pig Iron, Per Gross Ton:</b>				
No. 2 X, Philadelphia...	\$18.25	\$18.25	\$16.75	\$14.25
No. 2, Valley furnace...	<b>17.50</b>	17.00	15.25	12.75
No. 2 Southern, Cin'ti...	16.90	16.90	15.90	12.65
No. 2, Birmingham, Ala...	14.00	14.00	13.00	9.75
No. 2, furnace, Chicago*	18.00	18.00	17.00	13.00
Basic, del'd, eastern Pa.	<b>18.00</b>	17.75	17.00	13.50
Basic, Valley furnace...	<b>17.50</b>	16.50	15.50	12.50
Bessemer, Pittsburgh...	<b>19.45</b>	18.95	17.45	14.70
Malleable Bess., Ch'go*	18.00	18.00	17.00	13.00
Gray forge, Pittsburgh...	<b>17.95</b>	16.95	15.45	13.40
L. S. charcoal, Chicago.	17.75	17.75	16.75	15.75
<b>Billets, etc., Per Gross Ton:</b>				
Bess. billets, Pittsburgh.	<b>30.00</b>	29.00	26.00	19.00
O.-h. billets, Pittsburgh.	<b>31.00</b>	30.00	27.00	19.00
O.-h. sheet bars, P'gh...	<b>31.00</b>	30.00	28.00	19.50
Forging billets, bars, P'gh	52.00	52.00	45.00	24.00
O.-h. billets, Phila...	36.00	36.00	32.00	21.40
Wire rods, Pittsburgh...	<b>40.00</b>	38.00	35.00	25.00

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire.	Dec. 8, 1915.	Dec. 1, 1915.	Nov. 10, 1915.	Dec. 9, 1914.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	2.50	2.50	2.20	1.85
Galv. sheets, No. 28, P'gh	4.75	4.75	3.70	2.80
Wire nails, Pittsburgh....	2.00	2.00	1.85	1.50
Cut nails, Pittsburgh....	1.90	1.85	1.80	1.55
Fence wire, base, P'gh....	1.85	1.85	1.70	1.30
Barb wire, galv., P'gh....	2.85	2.85	2.70	1.90

Finished Iron and Steel.	Dec. 8, 1915.	Dec. 1, 1915.	Nov. 10, 1915.	Dec. 9, 1914.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bees. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia....	1.959	1.859	1.709	1.17
Iron bars, Pittsburgh....	1.80	1.65	1.50	1.15
Iron bars, Chicago....	1.60	1.60	1.45	0.90
Steel bars, Pittsburgh....	1.70	1.70	1.60	1.10
Steel bars, New York....	1.869	1.869	1.769	1.26
Tank plates, Pittsburgh....	1.90	1.90	1.60	1.05
Tank plates, New York....	2.169	2.169	1.769	1.26
Beams, etc., Pittsburgh....	1.70	1.70	1.60	1.10
Beams, etc., New York....	1.869	1.869	1.669	1.26
Skelp, grooved steel, P'gh	1.70	1.70	1.60	1.10
Skelp, sheared steel, P'gh	1.80	1.80	1.70	1.15
Steel hoops, Pittsburgh....	1.90	1.90	1.75	1.25

Old Material. Per Gross Ton:	Dec. 8, 1915.	Dec. 1, 1915.	Nov. 10, 1915.	Dec. 9, 1914.
Iron rails, Chicago....	16.00	16.00	14.50	11.00
Iron rails, Philadelphia....	19.00	17.50	17.50	13.00
Carwheels, Chicago....	14.50	14.50	13.00	9.50
Carwheels, Philadelphia....	15.00	14.50	14.00	10.00
Heavy steel scrap, P'gh....	17.50	17.25	15.50	10.50
Heavy steel scrap, Phila....	15.50	15.00	14.50	9.25
Heavy steel scrap, Ch'go....	15.00	15.00	12.75	8.25
No. 1 cast, Pittsburgh....	15.25	14.50	13.50	10.50
No. 1 cast, Philadelphia....	15.00	15.00	14.00	11.00
No. 1 cast, Ch'go (net ton)	13.75	13.75	11.75	9.00

Coke, Connellsville,	Per Net Ton at Oven:			
Furnace coke, prompt...	\$2.10	\$2.10	\$2.50	\$1.50
Furnace coke, future...	2.40	2.40	2.50	1.75
Foundry coke, prompt...	2.75	2.75	3.00	1.90
Foundry coke, future...	3.00	3.00	2.75	2.15

Metals.				
Per Lb. to Large Buyers :	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	19.87 1/2	20.00	18.25	13.00
Electrolytic copper, N. Y.	19.62 1/2	19.87 1/2	18.12 1/2	12.75
Spelter, St. Louis.....	14.75	18.00	15.75	5.50
Spelter, New York.....	15.00	18.25	16.00	5.65
Lead, St. Louis .....	5.17 1/2	5.20	5.05	3.67 1/2
Lead, New York.....	5.25	5.25	5.15	3.80
Tin, New York.....	37.25	39.50	36.50	32.50
Antimony, Asiatic, N. Y.	39.00	40.00	36.00	13.50
Tin plate, 100-lb. box, P'gh	\$3.50	\$3.50	\$3.25	\$3.20

## Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 42.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 73.9c. on plates, structural shapes and sheets and 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal is 56.9c.

Plates.—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.70c. to 1.90c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 6, 1903, or equivalent, 1/4 in. and over on thinnest edge, 10 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft. are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 1/4 in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under 1/4 in. to and including 3-16 in....	.10
Gages under 3-16 in. to and including No. 8....	.15
Gages under No. 8 to and including No. 9....	.25
Gages under No. 9 to and including No. 10....	.30
Gages under No. 10 to and including No. 12....	.40
Sketches (including straight taper plates), 3 ft. and over....	.10
Complete circles, 3 ft. in diameter and over....	.20
Boiler and flange steel....	.10
"A. R. M. A." and ordinary firebox steel....	.20
Still bottom steel....	.30
Marine steel....	.40
Locomotive firebox steel....	.50
Widths over 100 in. up to 110 in., inclusive....	.05
Widths over 110 in. up to 115 in., inclusive....	.10
Widths over 115 in. up to 120 in., inclusive....	.15
Widths over 120 in. up to 125 in., inclusive....	.25
Widths over 125 in. up to 130 in., inclusive....	.50
Widths over 130 in....	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive....	.25
Cutting to lengths, under 2 ft. to 1 ft., inclusive....	.50
Cutting to lengths under 1 ft....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Products.—Prices to jobbers: Fence wire, Nos. 0 to 9, per 100 lb., terms sixty days or 2 per cent discount in ten days, carload lots, annealed, \$1.85; galvanized, \$2.55. Galvanized barb wire and staples, \$2.85; painted, \$2.15. Wire nails, \$2. Galvanized nails, 1 in. and longer, \$2 advance over base price; shorter than 1 in., \$2.50 advance over base price. Woven wire fencing, 68 per cent off list for carloads, 67 off for 1000-rod lots, 66 off for less than 1000-rod lots.

Wire Rods.—Bessemer, open-hearth and chain rods, \$40.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees 3 in. and over, 1.70c. to 1.90c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in....	.10
H-beams over 18 in....	.10
Angles over 6 in., on one or both legs....	.10
Angles, 3 in. on one or both legs less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909....	.20 to .80
Deck beams and bulb angles....	.30
Handrail tees....	.75
Cutting to lengths under 3 ft. to 2 ft., inclusive....	.25
Cutting to lengths, under 2 ft. to 1 ft., inclusive....	.50
Cutting to lengths, under 1 ft....	1.55
No charge for cutting to lengths 3 ft. and over.	

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from Aug. 16, 1915, on steel and iron galvanized pipe, and from Nov. 1, 1915, on steel and iron black pipe, all full weight:

Butt Weld			Iron		
Inches	Steel	Black	Inches	Black	Galv.
1/4, 1/2 and 3/4....	71	46 1/2	1/4 and 1/2....	63	37
1/2....	75	59 1/2	3/4....	63	37
3/4 to 3....	78	63 1/2	1/2....	67	47
			3/4 to 2 1/2....	70	52
Lap Weld					
2....	75	60 1/2	1 1/4....	54	36
2 1/2 to 6....	77	62 1/2	1 1/2....	65	47
7 to 12....	75	58 1/2	2....	66	49
12 and 14....	61 1/2		2 1/2 to 4....	68	52
15....	59		4 1/2 to 6....	68	52
			7 to 12....	66	50

Reamed and Drifted					
1 to 3, butt....	76	61 1/2	1 to 1 1/2, butt....	68	50
2, lap....	73	58 1/2	2, butt....	68	50
2 1/2 to 6, lap....	75	60 1/2	1 1/4, lap....	52	34
			1 1/2, lap....	63	45
			2, lap....	64	47
			2 1/2 to 4, lap....	66	50

Butt Weld, extra strong, plain ends					
1/4, 1/2 and 3/4....	66	49 1/2	3/4....	60	43
1/2....	71	58 1/2	1/2 to 1 1/2....	65	51
3/4 to 1 1/2....	75	62 1/2	3/4 to 1 1/2....	69	53
2 to 3....	76	63 1/2	2 and 2 1/2....	70	54

Lap Weld, extra strong, plain ends					
2....	72	57 1/2	1 1/2....	64	48
2 1/2 to 4....	74	59 1/2	2....	66	49
4 1/2 to 6....	73	58 1/2	2 1/2 to 4....	68	52
7 to 8....	67	50 1/2	4 1/2 to 6....	67	51
9 to 12....	62	45 1/2	7 to 8....	60	44
			9 to 12....	55	39

Butt Weld, double extra strong, plain ends					
1/4....	61	48 1/2	1/2....	55	40
3/4 to 1 1/2....	64	51 1/2	3/4 to 1 1/2....	58	42
2 to 2 1/2....	66	53 1/2	2 and 2 1/2....	60	45

Lap Weld, double extra strong, plain ends					
2....	62	49 1/2	2....	56	40
2 1/2 to 4....	64	51 1/2	2 1/2 to 4....	58	45
4 1/2 to 6....	63	50 1/2	4 1/2 to 6....	57	44
7 to 8....	57	40 1/2	7 to 8....	50	33

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, on lap welded steel tubes and standard charcoal iron tubes, effective from Dec. 1, 1915, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
1 1/2 in....	47	1 1/2 in....	42 to 43
1 3/4 and 2 in....	59	1 3/4 and 2 in....	46 to 47
2 1/4 in....	56	2 1/4 in....	43 to 44
2 1/2 and 2 3/4 in....	62	2 1/2 and 2 3/4 in....	50 to 51
3 and 3 1/4 in....	67	3 and 3 1/4 in....	54 to 55
3 1/2 to 4 1/2 in....	68	3 1/2 to 4 1/2 in....	56 to 57
5 and 6 in....	61	5 and 6 in....	50 to 51
7 to 13 in....	58		

Locomotive and steamship special charcoal grades bring higher prices.

1 1/4 in., over 18 ft., 10 per cent net extra.  
2 in. and larger, over 22 ft., 10 per cent net extra.

**Sheets.**—Makers' prices for mill shipment on sheets, of U. S. Standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms thirty days net, or 2 per cent cash discount in ten days from date of invoice:

Blue Annealed Sheets		Cents per lb.
Nos. 3 to 8.....		2.20
Nos. 9 to 10.....		2.25
Nos. 11 and 12.....		2.30
Nos. 13 and 14.....		2.35
Nos. 15 and 16.....		2.45

Box Annealed Sheets, Cold Rolled		Cents per lb.
Nos. 10 and 11.....		2.15
No. 12.....		2.15
Nos. 13 and 14.....		2.20
Nos. 15 and 16.....		2.25
Nos. 17 to 21.....		2.30
Nos. 22 and 24.....		2.35
Nos. 25 and 26.....		2.40
No. 27.....		2.45
No. 28.....		2.50
No. 29.....		2.55
No. 30.....		2.65

Galvanized Sheets of Black Sheet Gage		Cents per lb.
Nos. 10 and 11.....		3.75
No. 12.....		3.85
Nos. 13 and 14.....		3.85
Nos. 15 and 16.....		3.95
Nos. 17 to 21.....		4.10
Nos. 22 and 24.....		4.30
Nos. 25 and 26.....		4.45
No. 27.....		4.60
No. 28.....		4.75
No. 29.....		4.90

## Pittsburgh

PITTSBURGH, PA., Dec. 7, 1915.

It is understood that quotations on Lake Superior iron ore for the coming season have been made. They start with Mesaba Bessemer at \$4.25, which is 80c. above this year's basis. On Mesaba non-Bessemer 70c. advance is asked over this year. It was generally expected that plates, shapes and bars would be advanced \$2 per ton, or to the basis of 1.80c., Pittsburgh, to-day, but as yet this has not been done. However, nearly all other commodities are higher, advances in the week including \$1 per ton on basic pig iron, 50c. on Bessemer iron, \$1 on foundry, \$1 on Bessemer ferrosilicon, \$2 on light rails, \$3 on iron bars, \$2 on shafting and 50c. to \$1 on scrap. It is difficult to quote accurate prices, as mills are sold up so far ahead that they are likely to name very high prices on inquiries. It is denied, however, that any large orders for plates, shapes and bars have been taken for second half of 1916 at 1.85c., Pittsburgh. It is claimed that any such sales for second half have been made only to allow consumers to cover on specific work on which they must name prices. One leading steel company states it has not sold a pound of material for delivery beyond June, but is being strongly importuned to do so. In a runaway steel market, such as now exists, the question of prices is a small factor. The desire of consumers is to get material on the books of the mills for delivery ahead, and in many cases such consumers leave it up to the mills to fix the price. The only item that is lagging is coke, and this is soft, owing to a surplus in the supply. It is believed that buying of iron and steel will now quiet down until after the holidays, as consumers are well covered for some months, while the mills are sold up, and do not care to book orders beyond second quarter. As yet, there is not a sign of any let-up in the greatest activity the steel trade has ever known.

**Pig Iron.**—The market on pig iron is becoming excited. Prices are 50c. to \$1 per ton higher. Reports are that contracts for fully half a million tons of Bessemer and basic iron have been placed in the past week for long deliveries, ranging from two to four years. No prices were named in these contracts, but the average price for each month, as given in THE IRON AGE, is to be the basis of settlement for shipments made in that particular month. Export inquiry for Bessemer and basic iron is active. A local interest sold last week 1500 tons of basic iron that netted \$17.86 at furnace, and later sold 1000 tons for January and 1000 tons for February at \$18.40 at furnace, to be shipped to Italy. Firm offers have been made of \$20 for 3000 tons of

Bessemer iron for shipment to Italy in January, but the offer has not yet been accepted. However, export prices being offered are much higher than domestic. We can report sales of 5000 to 6000 tons of No. 2 foundry iron at \$18 at furnace. W. P. Snyder & Co. report the average price of Bessemer iron in November to have been \$16.615, and of basic, \$15.518, these prices showing an increase in Bessemer iron over October of 61.5c. and in basic of 50.47c. These average prices are computed on actual sales of 1000 tons or over of Valley iron only. We quote: Standard Bessemer iron, \$18.50 to \$19; basic, \$17.50 to \$18; malleable Bessemer, \$17.25 to \$17.50; No. 2 foundry, \$17.50 to \$18, most consumers holding for the higher price; gray forge, \$17, all at Valley furnace. The freight rate for delivery to the Cleveland and Pittsburgh districts is 95c. per ton.

**Billets and Sheet Bars.**—Each transaction now has its own special conditions which largely govern the price. It is known positively that Bessemer billets and sheet bars to regular customers would readily bring \$30 and open-hearth billets and sheet bars \$31 if the steel could be obtained. It is also said that offers by others of \$2 to \$3 per ton higher than these prices have been made for both Bessemer and open-hearth billets, but without getting the steel. Reports are that as high as \$35 has been offered for 3000 tons of open-hearth billets without finding a seller that could spare the steel. We quote Bessemer billets and sheet bars at \$30 to \$31, and open-hearth billets and sheet bars at \$31 to \$32, maker's mill, Pittsburgh or Youngstown districts. We quote forging billets at \$52 for sizes up to but not including 10 x 10 in. and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take \$1 per ton extra. Axle billets are held at \$48 to \$50.

**Plates.**—Late last week the Pennsylvania Lines West placed contracts for 1000 steel gondola cars with the Haskell & Barker Car Company, and 1150 cars of the same type with the American Car & Foundry Company. The Pressed Steel Car Company has taken 100 ore cars for the Utah Copper Company. It is said inquiries are in this market for 5000 to 6000 cars, but that the chances of the roads closing for them are remote, owing to the high prices now asked. The nominal price of  $\frac{1}{4}$ -in. and heavier plates is 1.70c., but actual prices range from 1.80c. to 2c. or higher. Prices depend entirely on the consumer and how soon the material is wanted.

**Structural Material.**—Inquiry is active, but local fabricators say they are not bidding on all the work offered, as they are filled up so far ahead. The McClintic-Marshall Company has taken about 5000 tons for the new Chamber of Commerce Building to be erected on Smithfield Street in this city by George T. Oliver; the Riter-Conley Mfg. Company, 450 tons for a new steel boiler house for the Atlantic Refining Company, Franklin, Pa., and the Massillon Bridge & Structural Company, 420 tons for a steel factory building for the Morgan Engineering Company, Alliance, Ohio. The nominal price of beams and channels up to 15 in. is 1.70c., Pittsburgh, but for reasonably prompt deliveries 1.90c. to 2.25c. are being named for small lots.

**Steel Rails.**—Effective Friday, Dec. 3, prices on light rails were advanced \$2 per ton. It is said that most contracts for standard sections from the railroads have been placed, but some of them are coming in for additional quantities. The rolling schedules of the rail mills for the first six months of next year are filled. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We now quote light rails as follows: 25 to 45 lb. sections, 1.55c.; 16 and 20 lb., 1.60c.; 12 and 14 lb., 1.65c.; 8 and 10 lb., 1.70c., in carloads, the usual advances being charged for less than carloads.

**Ferroalloys.**—Owing to inability to get boats, shipments of Brazilian manganese ore to this country have stopped, and this makes the price of domestic ferromanganese uncertain. A sale was made early last week of 100 tons at \$110 at maker's furnace, but it is said as high as \$115 is now being quoted. Prices on foreign are also firmer, and it is held at \$110, seaboard. Prices on Bessemer ferrosilicon were again advanced on Mon-



day, Dec. 6, and makers say they have very little to sell for first quarter. Prices of Bessemer ferrosilicon for delivery in second quarter of 1916 are as follows: 9 per cent, \$27; 10 per cent, \$28; 11 per cent, \$29; 12 per cent, \$30; 13 per cent, \$31.50; 14 per cent, \$33.50; 15 per cent, \$35.50, and 16 per cent, \$38. Seven per cent silvery for same delivery is \$24.50; 8 per cent, \$25; 9 per cent, \$25.50; 10 per cent, \$26; 11 per cent, \$27, and 12 per cent, \$28. All these prices are f.o.b. at furnace, Jackson, Ohio; New Straitsville, Ohio, or Ashland, Ky., each of these points having a freight rate of \$2 per gross ton to Pittsburgh. We quote 50 per cent ferrosilicon for delivery through all of 1916 as follows: Up to 100 tons, \$85; over 100 tons and up to 600 tons, \$84, and over 600 tons, \$83, all per gross ton, delivered in the Pittsburgh district.

**Sheets.**—Prices now quoted on blue annealed, black and galvanized sheets are largely nominal, as most mills are practically sold up through first quarter, and have little to spare aside from light gages of black. The actual orders for hot sheet and tin mill products received by the American Sheet & Tin Plate Company in November were 31 per cent heavier than in October, and 41 per cent heavier than in any previous month. This company is now operating to 92 per cent of capacity. Prices are very strong and specifications heavy. For delivery through first quarter we quote Nos. 9 and 10 blue annealed sheets at 2.25c.; No. 28 Bessemer black, 2.50c., and No. 28 galvanized, 4.75c. We quote Nos. 22 and 24 gage black plate, tin mill sizes, H. R. and A., at 2.30c. to 2.40c.; Nos. 25, 26 and 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c., and No. 30, 2.50c. These prices are for carload and larger lots, f.o.b. maker's mill.

**Tin Plate.**—Export demand is heavier. The American Sheet & Tin Plate Company has taken a contract for slightly over 100,000 boxes for shipment to China. Inquiries are in the market for several lots of 25,000 boxes and one of 50,000 boxes for England. There are also inquiries from Norway, Sweden and Denmark, but domestic mills cannot make deliveries to these countries. Contracts are coming in at a fair rate for 1916 delivery at \$3.50 to \$3.60 per base box. It is said that only one or two of the largest consumers are holding off placing contracts for 1916 delivery on account of the price advance over last year. We quote 14 x 20 coke plates at \$3.50 to \$3.60 per base box for delivery over remainder of this year, and \$3.60 per base box for delivery over all of 1916. We quoteterne plate, 14 x 20, 8-lb. coating, at \$3.40 to \$3.50 per box, f.o.b. Pittsburgh.

**Railroad Spikes.**—Specifications against contracts from railroads are only fair, but from the jobbing trade are quite heavy. Spike makers are pretty well filled for two or three months, and prices are very firm. We quote standard spikes, larger than ½ in., at \$2.10; from ½ in. to ¾ in., \$2.20, and 5/16 in. and ¾ in. diameter, \$2.35, per 100 lb., f.o.b. at mill.

**Skelp.**—The new demand is more active, and mills have all the orders they can get out for two or three months. Prices are firm and likely to be higher. We quote grooved steel skelp at 1.70c. to 1.75c.; sheared steel skelp, 1.80c. to 1.85c.; grooved iron skelp, 2.10c. to 2.15c., and sheared iron skelp, 2.20c. to 2.25c., all delivered to consumers' mills in the Pittsburgh district.

**Wire Rods.**—It is said that very few consumers can afford to pay \$40 for wire rods and put them into finished material and sell it at a profit. At the same time, it would be hard to find any rods at less than \$40, and as high as \$42 has been quoted. Local makers are not selling to the outside trade, but are trying to take care of regular customers as best they can. We quote Bessemer, open-hearth and chain rods at \$40, maker's mill.

**Wire Products.**—One leading local maker is practically out of the market, being sold up to April or longer. The export demand is heavy, but very little of this is being taken by local mills, as they cannot make deliveries. Domestic consumers are specifying freely against contracts, and it is said that all the contracts for wire nails on the \$1.75 basis have about been cleaned up, and that the mills are working mostly now on the \$1.85 and \$1.90 contracts. It is stated that the

American Steel & Wire Company has had practically all its traveling men off the road for more than a month. Extras on galvanized nails have been increased 25c. per 100 lb. Prices quoted, for delivery at the convenience of the mills and to regular customers only, are as follows: Wire nails, \$2; galvanized nails 1 in. and longer taking an advance over this price of \$2, and shorter than 1 in., \$2.50; plain annealed wire, \$1.85; galvanized barb wire and fence staples, \$2.85; painted barb wire, \$2.15; polished fence staples, \$2.15, all f.o.b., Pittsburgh, with freight added to point of delivery; terms sixty days net, less 2 per cent off for cash in ten days. Prices on woven wire fencing are 68 per cent off list for carload lots, 67 per cent for 1000-rod lots, and 66 per cent for small lots, f.o.b., Pittsburgh.

**Rivets.**—Export and domestic demand are both heavy, and all the makers are back in shipments six to eight weeks or longer. A local maker shipped last week two cars of rivets to India and China. Contracts for second quarter have been placed at \$2.65 for structural and \$2.75 for boiler rivets. This week prices will be advanced \$2 per ton, which will put the price of structural at \$2.50, and boiler at \$2.60. Prices in effect at this writing for delivery through first quarter on buttonhead structural rivets, ½ in. and larger, are \$2.40, and on conehead boiler rivets, \$2.50 per 100 lb., in carload lots, f.o.b. Pittsburgh, smaller lots bringing 10c. advance.

**Hoops and Bands.**—Consumers are largely covered for some time ahead and specifications are heavy. We quote steel bands at 1.70c., with extras as per the steel bar card, and steel hoops at 1.90c., f.o.b. Pittsburgh.

**Shafting.**—Discounts on shafting have again been lowered two points, equal to an advance of \$2 per ton. However, prices are largely nominal, as none of the makers has any shafting to sell on new orders for delivery inside of six months or longer. For shipment at convenience of the mills we quote cold-rolled shafting at 50 per cent off in carloads and 45 per cent in less than carloads, f.o.b. Pittsburgh.

**Iron and Steel Bars.**—Effective from Friday, Dec. 3, prices on refined iron bars were advanced \$3 per ton. Makers of iron bars say the demand is greater than they can supply, and that the increased prices for mill pig iron and muck bar are responsible for the higher quotations on iron bars. We quote steel bars at 1.70c. to 1.80c., for delivery through first quarter; refined iron bars, 1.80c., and railroad test bars, 1.95c. in carload lots, f.o.b. Pittsburgh. Steel bars from stock in warehouse are selling at 2.25c. and higher.

**Cold-Rolled Strip Steel.**—Some makers are now quoting \$4 base for cold-rolled strip steel, but this is probably for the purpose of warding off orders to avoid bluntly refusing to take them. There has been no change in the official base price, which remains at \$3.50, but this is made only to regular customers and for such quantities as makers can get out. We quote cold-rolled steel, 1½ in. and wider, under 0.20 carbon, sheared or natural mill edge, per 100 lb., \$3.50, delivered. Extras are as follows:

0.10 to 0.19 Carbon—1½ In. and Wider					
Coils		Lengths 24 In. and Over			
Hard	Soft	Hard		Soft	
Base	\$0.25	100 and heavier		\$0.10	\$0.35
\$0.05	0.30	0.050 to 0.099		0.20	0.45
0.20	0.45	0.035 to 0.049		0.35	0.60
0.35	0.75	0.031 to 0.034		0.60	1.00
0.45	0.85	0.025 to 0.030		0.85	1.25
0.55	0.95	0.020 to 0.024		1.05	1.45
1.35	1.35	0.017 to 0.019		2.45	2.45
1.75	1.75	0.015 to 0.016		2.85	2.85
2.45	2.45	0.013 to 0.014		3.70	3.70
2.80	2.80	0.012		4.30	4.30
3.15	3.15	0.011		4.65	4.65
3.50	3.50	0.010		5.00	5.00

Extras for soft apply for all intermediate tempers.

**Merchant Steel.**—New orders are very heavy and mills are back in shipments eight to ten weeks. Prices are from \$2 to \$3 per ton higher and premiums are being paid for prompt delivery. On small lots for shipment at convenience of the mills we quote: Iron finished tire, ½ x 1½ in. and larger, 2.05c. base; under ½ x 1½ in., 2.20c.; planished tire, 2.25c.; channel tire, ¾ to ¾ and 1 in., 2.55c. to 2.65c.; 1 x ¾ in. and larger, 2.95c.; toe calk, 2.65c. to 2.75c., base; flat sleigh shoe, 2.40c.; concave and convex, 2.45c.; cutter shoe, tapered or bent, 2.95c. to 3.05c.; spring steel, 2.65c. to 2.75c.; machinery steel, smooth finish, 2.45c.

**Nuts and Bolts.**—Makers of nuts and bolts will likely advance prices about 10 per cent in a few days. The new demand is abnormally heavy, and both domestic and export orders are being refused by local makers, as they are filled up for four to six months. Discounts in effect at this writing are as follows:

Common carriage bolts,  $\frac{3}{4}$  x 6 in., and shorter and smaller, rolled thread, 75; cut thread, 70 & 10; larger or longer, 65 & 5. Machine bolts with h. p. nuts,  $\frac{3}{4}$  x 4 in., and shorter and smaller, rolled thread, 75 & 5; cut thread, 75; larger or longer, 65, 10 & 5. Machine bolts with c. p. c. t. and r. nuts,  $\frac{3}{4}$  x 4 in., and shorter and smaller, 70; larger or longer, 65. Forged set screws and tap bolts, 45. Rough stud bolts, 65. Lag screws (cone or gimlet point), 75 & 15. Square nuts, h. p., tapped or blank, \$5 off list; hexagon, \$5.30 off; c. p. c. t. and r. nuts, tapped or blank, square, \$4.50 off; hexagon, all sizes, \$5.70 off; plain c. p. square nuts, \$4.50 off; plain hexagon nuts, \$5 off; semi-finished nuts, 80. Rivets, smaller than  $\frac{1}{2}$  in. in diameter, 70, 10 & 10. All the foregoing prices are f.o.b. Pittsburgh, subject to an actual freight allowance not to exceed 20c. per 100 lb. on shipments of 300 lb. or more.

**Carwheels.**—The Pennsylvania Lines West placed 2150 cars last week on which steel wheels will likely be used. The Carnegie Steel Company and Standard Steel Car Company, the two makers of steel carwheels in this district, are sold up for four to six months. We quote 33-in. freight carwheels in lots of 1000 or more at \$18; 33-in. tender wheels, \$21; 36-in. passenger or tender wheels, \$25. These prices are based on a 10-in. diameter hub, 50c. extra being charged for 11-in., all f.o.b. Pittsburgh.

**Wrought Pipe.**—Makers report the demand steadily getting heavier. Nearly all the iron and steel pipe mills are running close to capacity. No large gas or oil lines are being placed and none is in the market. Discounts on black and galvanized iron and steel pipe are firmly held, and an advance is looked for in the near future.

**Boiler Tubes.**—The new demand for locomotive and merchant tubes is very heavy. Some former consumers of seamless tubes are now compelled to use lap-welded tubes, as they cannot get seamless. The two local makers of seamless tubes are practically out of the market, and report they have their output sold up through first half of next year or longer. Discounts on iron and steel tubes are firmly held.

**Old Material.**—The local scrap market quieted down in the early part of last week, but in the last two or three days took on renewed activity. A large consumer at Monessen, Pa., is reported to have bought 8000 to 10,000 tons of selected heavy steel scrap at \$17.75 to \$18, delivered. Several embargoes have been removed, and scrap is moving more freely to consumers. It is doubtful if any large amount of selected heavy steel scrap could be picked up at less than \$18, but, at the same time, it has been offered to two of the largest consumers in this district at that price and declined. We have advanced our quotations on nearly all grades of scrap from 50c. to \$1 per ton, and the market is very strong. We note a sale of 500 tons of borings at \$10.25, delivered. Dealers quote for delivery in the Pittsburgh and nearby districts that take the same rates of freight, as follows, per gross ton:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$17.50 to \$18.00
Compressed side and end sheet scrap.	16.00 to 16.25
No. 1 foundry cast	15.25 to 15.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	13.25 to 13.50
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	17.50 to 17.75
No. 1 railroad malleable stock	15.00 to 15.50
Railroad grate bars	10.75 to 11.00
Low phosphorus melting stock	21.50 to 22.00
Iron car axles	23.50 to 24.00
Steel car axles	26.00 to 26.50
Locomotive axles, steel	23.00 to 23.50
No. 1 busheling scrap	14.50 to 15.00
Machine shop turnings	9.50 to 10.00
Old carwheels	14.00 to 14.50
Cast-iron borings	10.50 to 10.75
*Sheet bar crop ends	17.00 to 17.50
Old iron rails	16.00 to 16.50
No. 1 railroad wrought scrap	17.00 to 17.50
Heavy steel axle turnings	13.00 to 13.50
Heavy breakable cast scrap	13.50 to 14.00

\*Shipping point.

**Coke.**—The local coke market is very quiet and prices are soft on prompt coke, due to a surplus in the

supply. Nearly all blast-furnace consumers are covered and new contract inquiry is light. We quote standard makes of blast-furnace coke for prompt shipment at \$2.10 to \$2.15 per net ton at oven; possibly \$2 could be done on a firm offer. Standard makes of blast-furnace coke on contracts for first half are held at \$2.40 to \$2.50, but some grades could be had at \$2.25. Standard makes of 72-hr. foundry coke for prompt shipment are firm at \$2.75 to \$2.85 and on contracts from \$3 to \$3.25 per ton at oven. The output in the upper and lower Connellsville regions for the week ended Nov. 27 was 432,341 net tons, a decrease over the previous week of 1061 tons.

## Chicago

CHICAGO, ILL., Dec. 7, 1915.

The unavailing efforts of steel users to secure satisfactory deliveries of material are beginning to show results in decreased sales, but specifications grow heavier. There is direct evidence that manufacturing operations in many lines are rapidly accelerating. The week's prices are especially interesting with reference to the premiums being paid for early deliveries of plates. A sale of 1000 tons is noted on the basis of 2.30c., Pittsburgh, and various sales at 2.25c., f.o.b. mill, are reported. The limited supply of other classes of material at any price is limiting premium business from becoming general. Rail purchases in the West last week exceeded 48,000 tons, and there is inquiry for 5000 to 10,000 tons additional. Store prices have been advanced on sheets, shafting, bolts and nuts. Pig-iron inquiry falls off but little, and sales are numerous and readily closed. Price advances have been particularly sharp for high-silicon and low-phosphorus irons. Southern iron is quoted here on the basis of \$14.50, Birmingham. The scrap market holds exceedingly strong, with a continuation of exceptional activity in the movement of material.

**Pig Iron.**—Melters appear to be of two classes, the one class whose business has greatly improved and which is almost entirely responsible for the heavy buying thus far, and another class which appears to have had but little business and must still buy considerable iron for the first half if normal requirements are to be protected. The lessening of inquiry is almost too slight to be noticed, and buyers who have not been in the market with general inquiries for a long period are now asking for iron. The Haskell & Barker Car Mfg. Company is taking prices on 1500 tons of malleable Bessemer, which is typical of other inquiry in the market aggregating several thousand tons. Local iron of regular grading readily commands \$18 to \$18.25, f.o.b. furnace, now being asked, while for silicon running 3 to 4 per cent \$22 at Chicago furnace has been paid. The scarcity of high-silicon irons is emphasized in the quotation for Ohio silvery which is now on the basis of \$27.50, Chicago, for 10 per cent. Low-phosphorus iron has also mounted to a high level, \$38, Chicago, being quoted. Inquiry is exceedingly spirited, and the number of sales has supported a series of exceptionally rapid advances. Demand for charcoal iron is brisk and one interest, with little more than 10,000 tons to sell to July 1, is adhering to a minimum quotation of \$19 at furnace. For Southern iron, \$14.50, Birmingham, appears to be the price for the larger number of sales made in the last few days. A comparatively small tonnage of Southern iron is available, and business is readily secured at that quotation. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	\$17.75 to \$18.75
Lake Superior charcoal, No. 1	18.25 to 19.25
Lake Superior charcoal, No. 6 and Scotch	18.75 to 19.75
Northern coke foundry, No. 1	18.50 to 18.75
Northern coke foundry, No. 2	18.00 to 18.25
Northern coke foundry, No. 3	17.50 to 17.75
Southern coke, No. 1 f'dry and 1 soft	18.50
Southern coke, No. 2 f'dry and 2 soft	18.25
Malleable Bessemer	18.00 to 18.50
Standard Bessemer	18.00
Basic	38.00
Low phosphorus	26.50
Silvery, 8 per cent	27.50
Silvery, 10 per cent	27.50



**Rails and Track Supplies.**—Rail inquiry and orders continue to appear in this territory in excess of expectations. The Frisco System last week placed 43,000 tons with the Tennessee Company, smaller lots of 1500 and 4000 tons were placed in Chicago, and the Nickel Plate is inquiring for 5000 to 10,000 tons. Light rail sales are considerably heavier than in a period of normal activity, but in this market the advance of \$2 per ton, announced at Pittsburgh this week, has not yet become effective. Spikes have been advanced to a minimum of 2.10c. and track bolts to 2.50c., Chicago. An advance of \$2 per ton in the price of tie plates is also announced. We quote standard railroad spikes at 2.10c., base; track bolts with square nuts, 2.50c., base, all in carload lots, Chicago; tie plates, \$36, f.o.b. mill, net ton; standard section, Bessemer rails, Chicago, 1.25c., base, open hearth, 1.34c.; light rails, 25 to 45 lb., 1.34c.; 16 to 20 lb., 1.39c.; 12 lb., 1.44c.; 8 lb., 1.49c.; angle bars, 1.50c., Chicago.

**Structural Material.**—Interest attaches to the placing of 1000 Pennsylvania cars with the Haskell & Barker Car Mfg. Company, to be built in the second half of the year. Other car business placed includes 1000 steel ore cars and 250 general service cars for the Duluth, Missabe & Northern, the former going to the Western Steel Car & Foundry Company and the latter to the Pullman Company. The Standard Steel Car Company and the American Car & Foundry Company will each furnish 250 cars for the Duluth & Iron Range and the Bettendorf Company, 1000 for the Minneapolis & St. Louis. The Milwaukee road will build 500 cars in its own shops, but has also advised that it will require axles sufficient for 1800 cars. With respect to other structural tonnage, the inquiry of the Missouri, Kansas & Texas for 2500 tons and the award of 4000 tons by the Inland Steel Company for additional mill buildings, about equally divided between the Kenwood Bridge Company and the Morava Construction Company, are of special interest. The American Bridge Company will furnish 650 tons of ore spouts for the Iron Range ore dock at Two Harbors; the Pennsylvania Steel Company, 435 tons for an ore bridge at the Pennsylvania dock, Erie, Pa., the Decatur Bridge Company, 813 tons for the Clay Products Company's buildings at Brazil, Ind., and the Hanke Iron Works, Chicago, 550 tons for the Pennsylvania freight terminal. Nominally the market for structural material is 1.70c., Pittsburgh, but prices vary up to 2c. for prompt shipment. The small amount of material available greatly minimizes the importance of price. We quote for Chicago delivery from mill 1.889c. to 1.989c.

Demand for steel out of stock is considerably increased. We quote for Chicago delivery of structural shapes from store 2.30c.

**Plates.**—The payment of premiums for early deliveries is more pronounced in connection with plates than any other commodity. At Chicago, 1000 tons was bought last week at a price equivalent to 2.30c., Pittsburgh, or a premium of \$12 per ton. Quotations of 2.25c., f.o.b. Cleveland mill, are noted in several instances, and even at these prices January delivery is the best obtainable. We quote for Chicago delivery of plates from mill 1.889c., nominally.

We quote for delivery of plates out of store for Chicago delivery 2.30c.

**Sheets.**—The market for galvanized sheets scarcely permits limitation within any specified range of prices. There is little to be had, and the quotations are what the mill desires to make them under the circumstances. For black sheets, 2.50c., Pittsburgh, appears to be the minimum quotation. We quote for Chicago delivery from mill, No. 10 blue annealed, 2.439c.; No. 28 black, 2.689c.; No. 28 galvanized, 4.939c.

Further advances in store prices for galvanized sheets are announced, the latest quotation being on the basis of 4.80c. for No. 28. We quote for Chicago delivery from jobbers' stock as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 2.60c.; No. 28 black, 2.75c.; No. 28 galvanized, 4.80c.

**Bars.**—The bar-iron mills are gradually accumulating sufficient tonnage to support operations on the basis of total capacity. Increased specifications from bar-iron users and the turning from steel to iron, if

continued at the present rate, will also make for the early accumulation of back logs. Specifications for steel bars are reported as exceedingly heavy. We quote mill shipments, Chicago, as follows: Bar iron, 1.60c. to 1.70c.; soft steel bars, 1.889c.; hard steel bars, 1.80c.; shafting, in carloads, 50 per cent off; less than carloads 45 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 2.20c.; bar iron, 2.20c.; reinforcing bars, 2.20c., base, with 5c. extra for twisting in sizes 1 $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting 40 per cent off.

**Rivets and Bolts.**—The bolt works of this district, almost without exception, are receiving liberal specifications against contracts and find their operations practically up to capacity. Rivet sales are fairly heavy, but this locality is capable of a large production. We quote as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 75; cut thread, 70-10; larger sizes, 65-5; machine bolts up to  $\frac{3}{4}$  x 4 in., rolled thread, with hot pressed square nuts, 75-5; cut thread, 75; larger sizes, 65-10-5; gimlet point coach screws, 75-15; hot pressed nuts, square, \$5 off per cwt.; hexagon, \$5.30 off per cwt. Structural rivets,  $\frac{3}{4}$  to 1 $\frac{1}{4}$  in., 2.40c. to 2.55c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.60c.; boiler rivets, 2.70c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 75; larger sizes, 65-10-5; carriage bolts up to  $\frac{3}{4}$  x 6 in., 70-10; larger sizes, 65-10 off; hot pressed nuts, square, \$5.40, and hexagon, \$5.70 off per cwt.; lag screws, 75-15.

**Old Material.**—The upward tendency of prices in the scrap market is generally unchecked, although the position of some grades of material is less clearly defined. The buying of heavy melting steel for the Gary works continues, but purchases are being made in a number of instances through direct channels which removes a considerable portion of the influence of this buying from the market. It is commonly reported that as much as \$16 has been paid on these orders, delivered at Gary. The high prices prevailing have brought out liberal tonnages of scrap, but such reactionary tendencies as have appeared are easily held in check by the volume of buying. The extremely high prices being paid to the railroads for scrap are evidence of a marked degree of confidence in the strength of the market. An interesting feature appears in the several instances where sellers of steel in various forms are making inducements to customers to return them the scrap from their manufacturing operations. Current railroad lists include 3800 tons offered by the Santa Fé, 1900 tons by the Wabash and 1400 tons by the Pere Marquette. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails .....	\$16.00 to \$16.50
Relaying rails .....	19.50 to 20.50
Old carwheels .....	14.50 to 14.75
Old steel rails, rerolling .....	16.00 to 16.50
Old steel rails, less than 3 ft. ....	15.75 to 16.00
Heavy melting steel scrap .....	15.00 to 15.50
Frogs, switches and guards, cut apart	15.00 to 15.50
Shoveling steel .....	14.75 to 15.25
Steel axle turnings .....	10.25 to 10.75

Per Net Ton	
Iron angles and splice bars .....	16.25 to 16.50
Iron arch bars and transoms .....	17.25 to 18.00
Steel angle bars .....	13.75 to 14.25
Iron car axles .....	18.50 to 19.00
Steel car axles .....	21.25 to 21.75
No. 1 railroad wrought .....	15.00 to 15.50
No. 2 railroad wrought .....	14.25 to 14.75
Cut forge .....	14.25 to 14.75
No. 1 busheling .....	13.00 to 13.50
No. 2 busheling .....	9.00 to 9.50
Pipes and flues .....	11.75 to 12.25
Steel knuckles and couplers .....	14.50 to 15.00
Steel springs .....	15.50 to 16.00
No. 1 boilers, cut to sheets and rings	10.75 to 11.25
Boiler punchings .....	13.75 to 14.25
Locomotive tires, smooth .....	14.75 to 15.25
Machine shop turnings .....	8.75 to 9.00
Cast borings .....	7.25 to 7.50
No. 1 cast scrap .....	13.75 to 14.25
Stove plate and light cast scrap .....	10.75 to 11.25
Grate bars .....	10.50 to 11.00
Brake shoes .....	10.00 to 10.50
Railroad malleable .....	13.75 to 14.00
Agricultural malleable .....	11.50 to 12.00

**Wire Products.**—The volume of specifications for wire is putting heavy pressure on the mills, and shipments, customers report, are falling considerably behind their desires. In accordance with the recent advance of \$2 per ton we have revised our quotations and



quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$2.039; wire nails, \$2.189; painted barb wire, \$2.339; galvanized barb wire, \$3.039; polished staples, \$2.339; galvanized staples, \$3.039, all Chicago.

**Cast-Iron Pipe.**—No award has been made, as yet, at Chicago of the 17,000 tons of pipe for which bids were received last week. Prices varied from \$26.65 per net ton to \$27.75, the latter price including a cartage charge. The 500 tons at Mishawaka, Ind., was taken by the Lynchburg Foundry Company and 800 tons at Dayton, Ohio, by the United States Cast Iron Pipe & Foundry Company. Tenders have been asked on 2250 tons at Minneapolis. Prices of pipe at Chicago have been advanced 50c. per ton, and we quote as follows per net ton, Chicago: Water pipe, 4 in., \$29.50; 6 in. and larger, \$27.50, with \$1 extra for class A water pipe and gas pipe.

## Philadelphia

PHILADELPHIA, PA., Dec. 7, 1915.

How irregular conditions are in the steel trade is emphasized by new developments coming to light every day. The scarcity of steel is greater than ever, and one producer tries to buy of another. Western consumers are looking to the East to supply their wants. The mills continue to turn down orders. Meanwhile quotations continue to advance, and published prices by no means represent what is paid in all transactions. Users of steel bars are turning to iron bars because of the scarcity of the former. Billets are difficult to find, and where found command high premiums, and the same is true of blooms, both of which are sought by foreign and domestic consumers. The November movement of foundry irons was even better than anticipated, although most of the business was in comparatively small lots. Prices of pig iron continue to advance, a former low seller of eastern Pennsylvania foundry now quoting \$18.50, furnace, and not being anxious to sell. There is considerable talk of \$20 iron. Virginia producers who have iron to sell are asking more. There is more doing in foundry coke. Old material has advanced. Steel axles are in heavy demand for export and command \$25, seaboard, a price which domestic consumers have not yet offered.

**Pig Iron.**—Producers were agreeably surprised by the aggregate of November's business in view of the few large orders for foundry iron which were booked. That they have reason to be gratified over the turn demand has taken in the past few weeks is clear from the fact that while in October a great many foundries appeared to be filled up for varying periods, some well into next year, these same foundries have been recent buyers for deliveries in the months supposed to be amply covered. In fact, the greatest change which the market has undergone is that indicated by the switching of inquiry for far-off delivery to that for prompt or nearby, all of which indicates that stocks, both in consumers' yards and on furnace banks, have been drawn on heavily. Prices are irregular, some brands which are well sold up being quoted higher than the actual market. Recent business in eastern Pennsylvania No. 2 X has been done at \$18.25 to \$18.75, delivered, but most of the sellers are asking over these figures. One, for instance, who is not desirous of quoting on either first or second quarter, is asking \$18.50, furnace, or about \$19.25, Philadelphia, for limited quantities. For another brand of No. 2 X, also eastern Pennsylvania, the minimum quotation is \$18.90, delivered, to the end of the first quarter. A Virginia furnace which has a limited amount of high manganese No. 2 X to offer is asking \$16.75, furnace, on deliveries running from now to July 1, and \$17, furnace, for the second quarter alone. For first half No. 2 plain it quotes \$16.25, furnace, and for second quarter only, \$16.50, furnace. The freight rate to Philadelphia is \$2.75. Talk of \$20, furnace, for eastern Pennsylvania No. 2 X is not infrequent. The Southern Railway is understood to have closed for 6000 tons of miscellaneous grades, equally divided between the first and second quarters, the order going to a Southern furnace. In the week 5000 tons of first-half gray

forge was taken by an Eastern consumer at a price understood to be near \$17.25, delivered. But little inquiry for basic has come to light, although a couple of thousand tons was taken by a seaboard consumer at \$18, delivered. Consumers of standard low phosphorus are well covered and the producers are sold up for the next few months. Within a day or two \$32, delivered, was quoted. Makers of Lebanon low phosphorus have little to offer, and for small lots are asking \$34 to \$35, furnace. Quotations for standard brands, delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Penna., No. 2 X foundry.....	\$18.25 to \$18.75
Eastern Penna., No. 2 plain.....	18.00 to 18.50
Virginia, No. 2 X foundry.....	18.50 to 18.75
Virginia No. 2 plain.....	18.00 to 18.50
Gray forge.....	17.25 to 17.75
Basic.....	18.00
Standard low phosphorus.....	32.00

**Iron Ore.**—No arrivals of foreign ore are reported for the week ended Dec. 4.

**Ferroalloys.**—Arrivals of 80 per cent ferromanganese at this port in the week ended Dec. 4 consisted of 976 tons. Shipments have been delayed, and those of the near future are consequently expected to be larger than had been anticipated. Those interested would rather see steady importations, inasmuch as these make for a more even distribution. The quotation is strong at \$100, seaboard, and inquiry is good. Ferrosilicon, 50 per cent, is unchanged at \$83 to \$85, Pittsburgh, according to quantity.

**Bars.**—The nominal quotation for steel bars is 1.80c., Pittsburgh, or 1.959c., Philadelphia, but with some of the mills entirely out of the market, and others with but little to sell, the exact market is problematical, unless buyers are willing to leave the matter of deliveries entirely to the mills. Carload lots of iron bars are quoted at 1.959c., Philadelphia, and less than carloads at 2.009c. The demand is very good, not a little of it coming from consumers who ordinarily use steel bars, but now cannot get them. An inquiry from a shellmaker in northern Pennsylvania is for 30,000 tons of 3-in. rounds for high-explosive shells.

**Plates.**—A leading mill in this territory is turning down orders, despite the fact that it is asking 2.159c., Philadelphia, on current business and 2.409c. on contracts, taking the latter only when it is absolutely necessary. Both the Middle and Far West are coming East for material. One mill is quoting 2.359c., Philadelphia, as its minimum, and can make fairly prompt deliveries.

**Structural Material.**—For this product, also, Western consumers are coming East, and on their inquiries 2.25c., Eastern mill, is quoted. On all other business 2.159c., Philadelphia, is named. The latter figure was quoted on 2300 tons last Saturday. While a well-known mill in the East has not entered the second quarter it is admitted that some of the first quarter specifications will run into the second. One large producer is endeavoring to contract with another producer for 25,000 tons. Snare & Triest were the low bidders on the McKeon Street pier shed, Philadelphia, estimated to require 5000 tons of shapes.

**Billets.**—The nearest definite quotations for open-hearth re-rolling billets range from \$36 to \$40, delivered, but makers have few to offer, and here again producers would like to buy. Forging billets are quoted at \$45 to \$55. Both billets and blooms are in heavy demand for export, and with this trade the price seems of little consequence to the buyers.

**Sheets.**—Makers continue to ask 2.40c., Pittsburgh, or 2.559c., Philadelphia, for No. 10 blue annealed, but an advance is predicted within the next day or two. Needless to say, the demand is heavy.

**Coke.**—Foundry coke is in fairly good demand. Both prompt and contract are quoted at \$3 to \$3.25 per net ton at oven, though some producers are asking up to \$3.50. Occasional lots of spot furnace are moving. Prompt furnace has been sold at \$2.25 per net ton at oven, or less, and is quoted at \$2.15 to \$2.30. Contract furnace ranges from \$2.25 to \$2.50. Freight rates from the principal producing districts follow: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

**Old Material.**—Advances have been general and sharp in the scrap market, and it is regarded as being in a healthy condition. The demand is good all along the line. Dealers have paid \$15.50 for heavy melting steel to protect their deliveries, or for speculative reasons. The steel scrap in the Pennsylvania Railroad's list last week brought over \$16, delivered, in eastern Pennsylvania. In steel axles a peculiar condition exists, inasmuch as \$25 is readily realized for export, whereas domestic consumers are not offering over \$22 to \$23, but they are not getting any. Railroad malleable is very strong. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$15.50 to \$16.00
Old steel rails, rerolling.....	17.25 to 18.25
Low phos. heavy melting steel scrap.	20.50 to 21.00
Old steel axles.....	24.00 to 25.00
Old iron axles.....	19.00 to 19.50
Old iron rails.....	15.00 to 15.50
Old carwheels.....	18.25 to 18.75
No. 1 railroad wrought.....	13.50 to 14.00
Wrought-iron pipe.....	12.50 to 13.00
No. 1 forge fire.....	12.50 to 13.00
Bundled sheets.....	10.00 to 10.50
No. 2 bushelling.....	10.25 to 10.75
Machine shop turnings.....	10.25 to 10.75
Cast borings.....	15.00 to 15.50
No. 1 cast.....	11.00 to 12.00
Grate bars, railroad.....	11.00 to 12.00
Stove plate.....	13.50 to 14.00
Railroad malleable.....	13.50 to 14.00

## Cleveland

CLEVELAND, OHIO, Dec. 7, 1915.

**Iron Ore.**—With the close of the shipping season and an ore movement of approximately 46,300,000 tons, shippers are turning their attention to the coming season and there are indications that the prices will be established before the end of this week, although some firms are trying to hold off the buying movement until after Jan. 1. Consumers are anxious to have prices named without further delay and as soon as the buying sets in it is expected that sales will be made with a rush. In fixing the 1916 prices an advance in the wages of the miners will have to be taken into consideration as well as higher lake freight rates. In 1914 there was quite a general cut in the wages of the miners, this ranging from 8 to 10 per cent, but the former wages have recently been restored by about all the mining companies. With an increase in the cost of labor and material and higher lake freights and higher royalties (where there is a sliding scale) it is estimated the cost of delivery at Lake Erie docks will be 25c. a ton higher next year than during the present season. Several shippers have so far been unable to contract for their required vessel capacity for the coming season and are showing some anxiety about the matter. With the expected heavy buying it will not take them long to sell all the ore for which they have contracted vessel capacity and they will be inclined not to make sales in excess of the tonnage for which they have succeeded in covering with vessel charters. Shipping records this season indicate that the lake fleet can bring down at least 55,000,000 tons of ore next season. Shipments from Aug. 1 to Dec. 1 show a gain of 2,765,115 tons over the same period in 1913. If shipments up to Aug. 1 this year had been at the same rate as during the corresponding period of 1913 the lake movement would have been close to 54,700,000 tons. In addition there is to be taken into consideration the fact that new boats now under contract will increase the vessel carrying capacity close to 1,000,000 tons next season. We quote 1915 prices as follows, delivered at lower lake ports. Old range Bessemer, \$3.85; Mesaba Bessemer, \$3.45; old range non-Bessemer, \$3; Mesaba non-Bessemer, \$2.85.

**Pig Iron.**—Prices on foundry iron have been advanced from 50c. to \$1 per ton by Cleveland, Valley and Toledo furnaces, to \$18 at furnace for No. 2 and a number of small lot sales have been made at that price. The Detroit price has been advanced to from \$18.75 to \$19. Before the last advance some foundry iron was sold at \$17 for shipment outside of this territory. There is a fair demand for small lots for the first half and advancing prices do not appear to check buying. Shipments on contracts are very heavy and stock piles have

been largely reduced. Bessemer iron has sold at \$19 for a 100 ton lot for December and January delivery. A local selling agency has received an inquiry for 50,000 tons of iron, grades not being specified, for shipment to Russia. Southern iron is 50c. a ton higher at \$14.50, Birmingham, for No. 2, although probably some resale iron can be had at \$14. A number of sales are reported in lots of 300 tons and under for the first half delivery. Several inquiries for Southern iron have come from the Buffalo territory. Southern iron can be delivered in this territory outside of Buffalo on about the same basis as Buffalo iron at \$18.50. We quote, delivered Cleveland, as follows:

Bessemer.....	\$19.45 to \$19.95
Basic.....	18.30
Northern No. 2 foundry.....	18.30
Southern No. 2 foundry.....	18.00 to 18.50
Gray forge.....	17.30
Jackson Co. silvery 8 per cent silicon.....	25.62
Standard low phos., Valley furnace.....	30.00

**Coke.**—The market is dull. There is a surplus of furnace coke for prompt shipment, on which the price is not firm. Furnace coke is quoted at 2.10c. to 2.25c. per net ton at oven for prompt shipment and 2.35c. to 2.50c. for first half. Standard Connellsville foundry coke is held at \$3 to \$3.50 for prompt shipment and contract.

**Finished Iron and Steel.**—There is considerable new demand, but consumers are having great difficulty in placing orders because of the congested condition of the mills. An example of this is shown in the fact that a local railroad inquiry for a small amount of steel for the first half that came out a few days ago failed to bring a single quotation. Some third quarter business, mostly in steel bars, has been taken at 1.80c., Pittsburgh. Plates are very firm at 2.25c., Pittsburgh, for early shipment, and local mills are taking small-lot orders at higher prices. The Toledo Terminal Railway Company has placed 1000 tons of rails with the Algoma Steel Company and the Clover Leaf is in the market for 5000 to 10,000 tons and the Ann Arbor line for 1500 tons. The Clover Leaf is also inquiring for 2000 tons of structural material for bridge work. The Massillon Bridge & Structural Company has taken 240 tons for a factory building for J. N. Hahn & Co., Cleveland. New structural inquiries include 2500 tons for the Louisville Bridge Company, Louisville, Ky., and for steel for an addition to the Hotel Statler in Detroit. The demand for sheets is very active. A heavy volume of orders for blue annealed sheets has come from the implement trade and these sheets are scarce. Considerable inquiry is coming from Canada for galvanized sheets. We quote black sheets at 2.50c. to 2.75c., Ohio mill, for No. 28; blue annealed sheets at 2.25c. for No. 10, and galvanized sheets at 4.50c. to 5c. for No. 28. Bar-iron prices have been advanced to 1.75c. to 1.80c., Cleveland mill. Hard steel bars are quoted at 1.60c., Pittsburgh. Local warehouse prices have again been advanced \$2 a ton to 2.50c. for steel bars, plates and structural material, with a further advance to 3c. for 2-in. and larger rounds and 2.65c. for 2-in. and larger squares.

**Bolts, Nuts and Rivets.**—The demand for bolts and nuts from all sources including the railroads is very heavy and considerable foreign business is coming out. Some of the makers are three to four months behind on deliveries and premium prices are being paid for early shipment orders. There is a heavy demand for rivets and makers are behind on shipments. We quote rivets at 2.40c., Pittsburgh, for structural and 2.50c. for boiler rivets, for delivery through the first quarter. Bolt and nut discounts are as follows:

Common carriage bolts  $\frac{3}{4}$  by 6 in., smaller or shorter, rolled thread, 75 per cent, cut thread, 70 and 10; larger or longer, 65 and 5; machine bolts with h.p. nuts  $\frac{3}{4}$  by 4 in., smaller or shorter, rolled thread 75 and 5, cut thread 75, larger and longer 65, 10 and 5; lag bolts, gimlet or cone point 75 and 15; square h.p. nuts, blanked or tapped, \$5 off the list; hexagon h.p. nuts, blank or tapped, \$5.30 off; c.p.c. and t. square nuts, blank or tapped, \$4.50 off; hexagon nuts, all sizes, \$5.70 off; cold pressed semi-finished hexagon nuts, all sizes, 80 off.

**Old Material.**—The market is very firm and prices on most grades are higher. Trading for the most part is between dealers who are covering on recent orders. The high prices are bringing out a great deal of scrap



which producers have been holding for advance. Steel and iron axles are \$1 per ton higher. Borings and turnings are comparatively quiet, but these grades and busheling have also advanced. Quotations on heavy melting steel are unchanged. An embargo is in force on the plant of the Upson Nut Company. We quote f.o.b., Cleveland, as follows:

Per Gross Ton	
Old steel rails	\$15.00 to \$15.25
Old iron rails	17.00
Steel-car axles	23.00 to 24.00
Heavy melting steel	15.25 to 15.50
Old carwheels	12.25 to 12.50
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	12.75 to 13.25
Railroad malleable	15.75 to 16.00
Steel axle turnings	12.50 to 12.75
Light bundled sheet scrap	11.75 to 12.00

Per Net Ton	
Iron car axles	\$20.00 to \$21.00
Cast borings	7.25 to 7.50
Iron and steel turnings and drillings	6.75 to 7.00
No. 1 busheling	12.25 to 12.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 cast	12.50 to 13.00
Railroad grate bars	9.75 to 10.00
Stove plate	9.50

## Buffalo

BUFFALO, N. Y., Dec. 7, 1915.

**Pig Iron.**—Small order demand from foundries continues in steady volume in spite of high prices, which are stiffening on all grades. Very little high silicon foundry iron is left, and there is practically a famine in 8 to 15 per cent qualities. Bessemer iron has also practically disappeared and little or no malleable is being offered—and none at less than \$20 f.o.b. furnace. Continued demand is noted for some of the special foundry grades at \$20 at furnace. Two of the producing interests of the district are now quoting a \$20 minimum for any of their product. Furnaces have declined last half delivery orders to the extent of several thousand tons. One of the Wickwire Steel Company's stacks is out of blast for relining. We continue last week's prices, as there still seems to be some iron procurable on about the basis of these figures, f.o.b. furnace, Buffalo, for current and first quarter and first half delivery.

No. 1 foundry	\$18.00 to \$19.00
No. 2 X foundry	17.50 to 18.50
No. 2 plain	17.00 to 18.00
No. 3 foundry	17.00 to 18.00
Gray forge	17.00 to 18.00
Malleable	18.00 to 19.00
Basic	18.00 to 18.50
Charcoal, regular brands and analysis	21.00 to 22.00

**Finished Iron and Steel.**—Orders are coming in freely, but mills are not accepting any except from regular customers and for shipment at mills' convenience, which means in most instances the latter part of the second quarter. Specifications and inquiries have grown to such abnormal proportions that mills are obliged to limit customers to a pro-rata of their requirements. There has been no change for the week in steel bars, plates and shapes, which are still nominally at 1.70c., base, although most mills are declining to quote, because of inability to ship within a reasonable period. Prices for iron bars have been advanced to 1.75c. and 1.80c., f.o.b. mill. This advance, it is stated, is due largely to the scarcity and high price of scrap. Warehouse business is growing daily and stocks are being rapidly depleted, particularly in standard sizes. The warehouse price for large rounds and squares has been advanced to 3.15c., being \$9 per ton higher than last week. Railroad and boat spikes have been advanced \$2 per ton, and it is understood that some of the Eastern mills are quoting only when inquiry is accompanied by specification lists. Chain prices have also been put up so that spot orders are now being accepted on the basis of \$3.65 per 100 lb. for  $\frac{3}{8}$ -in., f.o.b. cars, Pittsburgh, and first quarter business at an advance over this. Wire and wire products have advanced \$2 per ton and boiler tubes \$1 per ton. Bids are being taken this week for 1000 tons of steel sheet piling and 500 tons of reinforcing bars for foundation work for the Buffalo General Electric Company and the Lackawanna Bridge Company, Buffalo, has the general contract. Over \$400,000 worth of electrical machinery and equip-

ment has been ordered for this power-house from the General Electric Company, Schenectady. The Lackawanna Bridge Company has also secured the contract for 800 tons of fabricated steel for overhead electrification work for the Pennsylvania Railroad, Philadelphia. Bids are soon to be taken for service building for the Main Street Development Company, Buffalo, 100 tons; and for 150 tons for the Columbia Verein Club, Buffalo. The American Bridge Company has taken 600 tons for the plant addition of the Union Carbide Company at Sault Ste. Marie, Mich. The Buffalo Structural Steel Company has contracts for steel for United States Post Office at Salamanca, N. Y., addition to the plant of the Pratt & Lambert Company, Buffalo; addition to the International Brewing Company, Buffalo, 100 tons each.

**Old Material.**—Activity continues in the scrap iron market, with heavy melting steel leading. Notwithstanding an embargo placed by several plants in the Pittsburgh and Youngstown districts, consumers have placed between 25,000 and 30,000 tons, principally heavy melting steel. Some users have covered requirements for the next two or three months. Other consumers, served from the Buffalo district, have come into the market with inquiries for several large blocks of heavy melting steel, aggregating about 25,000 tons. Every large plant in the district, operating to a large percentage of capacity, is producing considerable quantities of scrap, particularly turnings. We quote dealers' asking prices, per gross ton f.o.b. Buffalo, as follows:

Heavy melting steel	\$15.50 to \$16.00
Low phosphorus steel	19.50 to 20.00
No. 1 railroad wrought scrap	14.50 to 15.00
No. 1 railroad and machinery cast scrap	14.25 to 14.75
Old steel axles	21.00 to 21.50
Old iron axles	21.00 to 21.50
Old carwheels	14.50 to 15.00
Railroad malleable	14.50 to 15.00
Machine shop turnings	7.00 to 7.50
Heavy axle turnings	11.50 to 12.00
Clean cast borings	8.50 to 9.00
Old iron rails	16.00 to 16.50
Locomotive grate bars	10.50 to 11.00
Stove plate (net ton)	9.50 to 10.00
Wrought pipe	12.50 to 13.00
Bundled sheet scrap	11.00 to 11.50
No. 1 busheling scrap	13.00 to 13.50
No. 2 busheling scrap	10.50 to 11.00
Bundled tin scrap	12.00

## Cincinnati

CINCINNATI, OHIO, Dec. 8, 1915.—(By Wire.)

**Pig Iron.**—Inquiries are more numerous and sales also show some improvement, although as far as foundry iron is concerned they are mostly for small lots. Two Indiana melters took 500 tons each of Southern iron, one lot for December and January shipment and the other for first half. An Indiana stovemaker is also reported to have closed for a round lot of Southern foundry to be shipped before July 1. A Michigan consumer bought 2000 tons of Lake Superior charcoal for first half and a few small lots of silvery irons were taken by Michigan and Indiana buyers. An inquiry is out from Indiana for 1500 tons of malleable and approximately 5000 tons of foundry iron is wanted in Michigan, both for first half. It is reported that further basic sales have been made in this territory lately and that the furnaces are not in a position to take on any more first half business. This has naturally tended to strengthen Northern foundry iron prices, and we quote No. 2 foundry to-day at \$17.50, Iron-ton, for either prompt or first half shipment. Malleable is also on the same basis, but no prompt quotations are available on basic as there is none to offer for nearby shipment. Southern foundry iron has not responded as quickly to the recent advance, and one large furnace interest offered last week to take on first half business on a basis of \$13.50, Birmingham, although only a small lot was sold at this figure. There is also a small quantity of resale iron that could be obtained at the same figure for nearby shipment. A number of furnaces are now quoting \$14.50 and one producer is holding at \$15, Birmingham. Ohio silvery irons have again been advanced and \$25 at furnace is now generally quoted for either prompt or first half shipment, although this figure could probably be shaded on at-



tractive business. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$17.40 to \$17.90
Southern coke, No. 2 f'dry and 2 soft.	16.90 to 17.40
Southern coke, No. 3 foundry.	16.40 to 16.90
Southern No. 4 foundry.	15.90 to 16.40
Southern gray forge	15.40 to 15.90
Ohio silvery, 8 per cent silicon	26.26 to 26.76
Southern Ohio coke, No. 1.	19.26 to 19.76
Southern Ohio coke, No. 2.	18.26 to 18.76
Southern Ohio coke, No. 3.	17.76 to 18.26
Southern Ohio malleable Bessemer.	18.26 to 18.51
Basic, Northern	18.26 to 18.51
Lake Superior charcoal	19.20 to 20.20
Standard Southern carwheel	24.40 to 24.90

#### (By Mail)

**Coke.**—Leading interests are quoting Connellsville 48-hr. coke at \$2.25 for prompt and \$2.60 future per net ton at oven. Connellsville foundry is unchanged at \$3 to \$3.50 at oven, although it would be difficult to obtain some of the leading brands at the minimum price quoted. Wise County, New River and Pocahontas producers are holding furnace coke all the way from \$2.65 to \$3 per net ton at oven and foundry coke from \$3.15 to \$3.50. Some business has been done lately both in furnace and foundry grades, but no large contracts have come to light. So far the car shortage has not seriously affected deliveries to consumers in this territory.

**Finished Material.**—Business is quite brisk in both black and galvanized sheets as well as reinforcing concrete bars. The nearby mills are quoting No. 28 black sheets at 2.65c., f.o.b. Cincinnati, and Newport, Ky., and No. 28 galvanized at 5.15c. Warehouse stocks of sheets are not large, but a small quantity of No. 28 galvanized may be obtained from local jobbers around 4.75c. The store price of No. 10 blue annealed sheets is 2.60c.; steel bars, 2.35c.; structural shapes, 2.45c. Reinforcing concrete bars are quoted at 2.50c. for  $\frac{3}{4}$ -in. and larger. Some improvement is noted in the demand for railroad track material. The call for round steel bars for shrapnel purposes has caused the mills to advance delivery dates, and mill prices for 2-in. rounds and over are \$5 per ton above regular quotations for the smaller sizes.

**Old Material.**—Business is improving and prices are firm. No. 1 machine cast scrap and No. 1 wrought probably lead in the demand for the different grades. No advance in prices has been made, but present quotations are very strong. Railroad offerings are reported lighter. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, Southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

#### Per Gross Ton

Bundled sheet scrap	\$10.00 to \$10.50
Old iron rails	13.75 to 14.25
Relaying rails, 50 lb. and up.	21.25 to 21.75
Revolving steel rails	12.75 to 13.25
Heavy melting steel scrap	11.75 to 12.25
Steel rails for melting	11.75 to 12.25

#### Per Net Ton

No. 1 railroad wrought.	\$10.75 to \$11.25
Cast borings	7.25 to 7.75
Steel turnings	6.75 to 7.25
Railroad cast scrap	11.25 to 11.75
No. 1 machinery cast scrap.	12.75 to 13.25
Burnt scrap	8.25 to 8.75
Iron axles	17.00 to 17.50
Locomotive tires (smooth inside)	11.00 to 11.50
Pipes and flues	8.50 to 9.00
Malleable and steel scrap	9.75 to 10.25
Railroad tank and sheet scrap.	7.75 to 8.25

## Birmingham

BIRMINGHAM, ALA., Dec. 6, 1915.

**Pig Iron.**—Toward the close of last week the Sloss-Sheffield Steel & Iron Company advanced its price from \$14 to \$14.50. At the same time the Republic Iron & Steel Company announced that it had no iron for sale for any delivery under \$14.50. The leading interest gave out the statement that "sales had been very satisfactory indeed; that nothing below \$13.50 had been booked and that some iron had been sold above that figure." Boiled down, this means that \$14.50 is about the Birmingham district level. It is probably difficult to get even spot iron at \$14. The Sloss-Sheffield Company sold from Oct. 5 to Dec. 2 a total of 100,000 tons as compared with its make for the period of about

70,000 tons. It booked 10,000 tons in the first two days of December. The status of one interest is this: It has 16,000 tons in its yards and is due to deliver this month 52,000 tons. It expects to make 25,000 tons. At this rate, if deliveries are made, the company will not have a ton in its yards by Jan. 1. This same company has booked already an average of 20,000 tons per month for the first quarter and an average of over 10,000 tons per month for the second quarter, with an average monthly make of 25,000 tons. This is an example of how fully and far ahead the leading iron interests are sold up. In the past week this company sold a total of 1600 tons of forward iron at \$14.50, divided among eight customers in lots of 50 to as high as 600 tons. The Sloss-Sheffield Company has been successful in turning out a quantity of high manganese iron, for which it has received \$16 per ton with inquiry from users of it for more. Furnace operators are elated over the reinstitution by the courts of their injunction against the railroads restraining the latter from putting into effect their threatened raise in rates on raw materials from mines and quarries to furnaces. The injunction is made good, pending a hearing by the State Supreme Court and the delay in final adjudication, which is expected to be against the furnace interests, means a great saving on raw material meanwhile. The Tennessee Company has blown in its fourth Bessemer stack. Export business is dull, owing to lack of ship room. General indications point to \$15 for iron in the very near future, owing to exceedingly crowded conditions of order books. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft.	\$14.50 to \$15.00
No. 2 foundry and soft.	14.00 to 14.50
No. 3 foundry.	13.50 to 14.00
No. 4 foundry.	13.25 to 13.75
Gray forge	13.00 to 13.50
Basic	14.00 to 14.50
Charcoal	22.50 to 23.00

**Cast-Iron Pipe.**—The water and gas pipe manufacturers report continued activity, which bids fair to be unprecedented for this period of the year and with every indication of indefinite prolongation. The orders come from every direction, but especially the Middle West. The sanitary pipe shops have also become busy, with practically all Alabama factories running four to five days per week, and some more. Belief that pig iron is going higher has led sanitary pipe dealers to give large orders for stock ahead. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$23.50; 6-in. and upward, \$21.50, with \$1 added for gas pipe.

**Coal and Coke.**—Coal has improved considerably, so much so that higher prices are being discussed. Railroads have commenced taking the maximum requirements under their coal contracts. Coke is strong and active. There is practically no by-product coke on the market and all beehive coke is taken at the prevailing prices. The announcement of the re-opening of railroad lines into Mexico via Eagle Pass has instigated a considerable inquiry from Mexican coke consumers. We quote, per net ton, f.o.b. oven, as follows: Beehive furnace, \$2.75 to \$3; foundry, \$3.25 to \$3.50, with the latter price prevailing and some makes selling at \$3.75.

**Old Material.**—Scrap dealers report that their only trouble lies in securing stock. Light steel scrap has sold in considerable quantities, but all kinds of steel scrap are moving actively. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	\$14.50 to \$15.00
Old steel axles	14.00 to 14.50
Old iron rails	13.50 to 14.00
No. 1 railroad wrought.	10.50 to 11.00
No. 2 railroad wrought.	9.50 to 10.00
No. 1 country wrought.	9.00 to 9.50
No. 1 machinery cast.	10.00 to 10.50
No. 1 steel scrap	10.00 to 10.50
Tram carwheels	10.00 to 10.50
Stove plate	8.00 to 8.50

The Timken Roller Bearing Company, Canton, Ohio, has finished the erection of its new tube mill building and is now installing the equipment. The plant will be ready for operation about Feb. 1. It will make drawn seamless steel tubing to be used in the manufacture of the company's products.

## St. Louis

St. LOUIS, Mo., Dec. 6, 1915.

**Pig Iron.**—Sales follow inquiries quickly, but the aggregate is showing some decrease, having been mostly below 300 tons individually, though on the whole quite satisfactory. The largest sale of foundry iron was 750 tons of No. 2 Southern, the only inquiry being one for 3000 tons of basic. An inquiry for 100 tons of ferromanganese is also pending. Consumption is apparently increasing, with renewed requests for prompt shipment on allotment and even in anticipation of these.

**Coke.**—The market is firmer. Future deliveries are stronger and slightly higher, with prompt shipment held firmly.

**Finished Iron and Steel.**—The extended character of the deliveries has become more pronounced both as to time and as to the range of products. There is some inclination to contract ahead, though not so pronouncedly as to make it particularly heavy. The small lots ordered are keeping the aggregate considerably above normal. Bars are being taken freely and plates have improved in demand. Light rails are being bought by the coal interests. Both reinforcing and ordinary bars are in good demand. Movement out of warehouse has been free in spite of price revisions upward, and we quote as follows: Soft steel bars, 2.25c.; iron bars, 2.20c.; structural material, 2.35c.; tank plate, 2.35c.; No. 10 blue annealed sheets, 2.65c.; No. 28 black sheets, cold rolled, one pass, 3c.; No. 28 galvanized sheets, black sheet gage, 5.10c.

**Old Material.**—There has been a steadying of the market which has heretofore been somewhat feverish, but prices are held as strongly as ever, while the buying, though a little more discriminating as to kind and quality, continues good. Dealers are not speculating as much as they were, and it is beginning to look as if shortages were pretty well covered. The apparent lull is probably due to the approach of the end of the year and inventory time. More dealers are willing to sell than was the case a week ago, but they are not shading the prices to any extent. The higher quotations continue to make purchasers discriminating in their inspection. Relayers are very stiff and in good demand, with supply continuing short. One offering this week helped to relieve the pressure, the Chicago, Milwaukee, St. Paul & Omaha putting out 4500 tons of relayers. Other lists included 2000 tons from the Wabash, 2500 tons from the Missouri, Kansas & Texas, 500 tons from the Kansas City Southern, 1000 tons from the St. Louis Southwestern, 400 tons from the St. Louis & San Francisco, 1000 tons from the Mobile & Ohio, 2000 tons from the Southern Railway and 18,000 tons from the Baltimore & Ohio Southwestern. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	\$14.50 to \$15.00
Old steel rails, rerolling	16.00 to 16.50
Old steel rails, less than 3 ft.	16.00 to 16.50
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	13.00 to 13.50
No. 1 railroad heavy melting steel scrap	15.00 to 15.50
Heavy shoveling steel	13.00 to 13.50
Frogs, switches and guards cut apart	15.00 to 15.50
Bundled sheet scrap	9.00 to 9.50
Per Net Ton	
Iron angle bars	\$14.50 to \$15.00
Steel angle bars	13.50 to 14.00
Iron car axles	18.50 to 19.00
Steel car axles	19.00 to 19.50
Wrought arch bars and transoms	16.50 to 17.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
Railroad springs	14.00 to 14.50
Steel couplers and knuckles	14.50 to 15.00
Locomotive tires, 42 in. and over, smooth inside	12.75 to 13.25
No. 1 dealers' forge	9.75 to 10.25
Mixed borings	8.00 to 8.50
No. 1 bushing	11.75 to 12.25
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
No. 1 railroad cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.25 to 9.75
Railroad malleable	10.50 to 11.00
Agricultural malleable	9.50 to 10.00
Pipes and flues	9.50 to 10.00
Railroad sheet and tank scrap	8.25 to 8.75
Railroad grate bars	9.50 to 10.00
Machine shop turnings	8.50 to 9.00

Automobile imports into Japan in 1914 were valued at only \$119,824 as compared with \$301,298 in 1913.

## New York

NEW YORK, Dec. 8, 1915.

**Pig Iron.**—Buying is not general and a few important consumers have furnished most of the business for the past week. The International Steam Pump Company is in the market for something over 14,000 tons for various plants for delivery in the second half of 1916. A New Jersey manufacturer of pneumatic machinery has bought about 4500 tons for the first quarter of next year. Furnaces continue to mark up prices and are realizing the new levels in a part of the current transactions. In eastern Pennsylvania quotations for the first quarter of next year range from \$17.50 to \$18 at furnace for No. 2 X foundry iron. Virginia irons are about \$1 a ton higher than last week. The statistics of pig iron production seem rather favorable to sellers, as they show the difficulties attending efforts to expand output beyond the level reached in October. An uncertain factor is the amount of stock carried in consumers' yards. In some cases this is of fair proportions; in others it is evident that buyers did not anticipate that their operations would be on such a scale as they have reached recently. Buffalo irons range from \$18 to \$19. While \$20 is mentioned in connection with Buffalo iron the amount sold at that figure is insignificant. The pig iron market is interested in the requirements of concerns that are bidding on the 40,000 tons of cast iron tunnel segments required for additional subway work. The presumption is that bidders are protected through pig iron quotations given them some time ago, but this is not altogether the fact. We quote at tidewater as follows for this year's delivery: No. 1 foundry, \$18.50 to \$19; No. 2 X, \$18.25 to \$18.50; No. 2 plain, \$17.75 to \$18. Southern iron at tidewater, \$18.75 to \$19 for No. 1 and \$18.25 to \$18.50 for No. 2 foundry and No. 2 soft.

**Ferroalloys.**—Inquiries for 1000 to 1500 tons of ferromanganese are before the market for early delivery, much of this coming from Canada. Sales of small lots have been made at \$100, seaboard, which quotation is considered firmer than for some weeks. There is a distinct absence of a tendency to shade this price. Receipts from England are reported at the same rate as for the last three months. The market in general is quiet with now and then a consumer somewhat anxious as to his future supplies which have lately been decidedly reduced. Spiegeleisen is quieter than a week or so ago, recent large sales at \$28 to \$30, furnace, having been made, as noted. Ferrosilicon, 50 per cent, is in strong demand with quotations tending upward, one of \$90, Pittsburgh, having been reported.

**Finished Iron and Steel.**—Plain structural material is still obtainable at 1.70c., Pittsburgh, but most of the new business is at higher prices, common quotations ranging from 1.80c., Pittsburgh, in say eight to ten weeks to 2c. for much earlier shipments. Opinion is not unanimous regarding the demands of the early future for building work, but movement on contracts is heavy, although this is naturally from manufacturers chiefly for bar sizes of shapes, which are now \$1 higher out of warehouse than a week ago. The largest structural awards are probably the Oceanic Building, Fifth Avenue and Forty-second Street, 2000 tons, awarded to Post & McCord, Inc., and 2000 to 3000 tons, and also the general contract, for the Buffalo General Electric Company, Buffalo, taken by the Lackawanna Bridge Company, but the 2000 tons for the building to occupy the site of Eden Musee, Twenty-third Street, is an early expectation. About one thousand tons represents other work likely to be closed in a few days. The latest railroad inquiry is from the Southern for about 1000 tons of bridge work, bids due Dec. 15 and 16 and the railroad car business is noted elsewhere in this issue. Further last half contracting for structural shapes is noted. Steel bars remain nominally at 1.70c., Pittsburgh, but offers of a few hundred tons of plain bars for concrete reinforcement at premiums as high as \$6 per ton for shipment in January were refused by some of the mills, and it is probable that urgent business of this kind must go to bar-iron mills. These



find no difficulty in getting 1.80c., Pittsburgh, even for lots approaching 1000 tons. The most interesting development in plates is the withdrawal of one Eastern mill from export business and quotations by another at 2.25c., Pittsburgh. Export generally is dependent on securing vessel room, and so far ahead are vessels spoken for that fresh export buying proceeds slowly, with 60,000 to 70,000 tons of rails for Russia for example, in the balance for this reason alone. The Lukens Iron & Steel Company and the Phoenix Iron Company will supply the plates and shapes respectively for a yacht to be built at the Jacob's yard at City Island and Kyle & Purdy are figuring on eight scows taking in all 400 tons of steel. We quote mill shipments of steel bars nominally at 1.869c., New York; plates at 1.869c. and 2.169c., New York, the former price in some months and the latter in some weeks; structural shapes at 1.869c. to 2.169c., New York, according to size of order and urgency of shipment, and iron bars at 1.969c., New York. For warehouse buying we quote iron and steel bars and structural material at 2.40c. and steel plates at 2.50c.

**Cast-Iron Pipe.**—The Warren Foundry & Machine Company was the successful bidder on 612 tons on which the city of Providence, R. I., opened bids Dec. 6. Buying for spring delivery is much greater than usual in December. Water and gas companies are entering the market freely, undoubtedly being impressed by the steadily advancing prices of pig iron, which promise considerably higher prices for pipe. No municipal lettings are announced for the near future. Carload lots of 6-in., class B and heavier, continue to be quoted at \$27 per net ton, tidewater, class A and gas pipe taking an extra of \$1 per ton.

**Old Material.**—The market is stronger, prices showing a decided upward tendency. This is in sympathy with developments in the old material market at Pittsburgh. Eastern Pennsylvania consumers are either out of the market or offer prices much below the views of sellers. Not a few dealers appear to be more interested in acquiring stocks than in endeavoring to effect sales. The belief prevails that prices of old material will be higher and that profits will inure to those in control of good supplies. Brokers are paying about as follows to local dealers and producers, per gross ton, New York:

Old girder and T rails for melting.....	\$14.25 to \$14.75
Heavy melting steel scrap.....	14.25 to 14.75
Relaying rails.....	21.50 to 22.00
Rerolling rails.....	15.50 to 16.00
Iron car axles.....	24.00 to 25.00
Steel car axles.....	25.00 to 26.00
No. 1 railroad wrought.....	16.00 to 16.50
Wrought-iron track scrap.....	15.00 to 15.50
No. 1 yard wrought, long.....	14.50 to 15.00
No. 1 yard wrought, short.....	14.25 to 14.75
Light iron.....	4.50 to 4.75
Cast borings.....	8.00 to 8.25
Wrought turnings.....	8.00 to 8.25
Wrought pipe.....	11.50 to 11.75
Old carwheels.....	13.00 to 13.50
Malleable cast (railroad).....	12.00 to 12.50

The demand for cast scrap has been less pronounced the past week. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery).....	\$14.00 to \$14.50
No. 2 cast (heavy).....	13.00 to 13.25
Stove plate.....	10.00 to 10.50
Locomotive grate bars.....	10.00 to 10.50

The Cleveland-Cliffs Iron Company, at a recent meeting of its stockholders, authorized an increase in its capital stock from \$5,000,000 to \$10,000,000 and instructed the directors to determine what disposition is to be made of the new stock. A stock dividend may be authorized and some of the stock may be sold at par to the present stockholders. The purpose of the increase in the stock is to reduce its market and book values in order to bring them near the par value. The company resumed the payment of dividends in October on a 10 per cent annual basis after a discontinuance of dividends for about a year.

The Gerlinger Steel Casting Company, Fifty-ninth and National avenues, Milwaukee, Wis., has placed in operation a Snyder electric furnace having a 24-hr. capacity of 6 tons.

## German Steel Syndicate Totters

### Important Interests to Withdraw—Disagree Over Allotments of Beams

BERLIN, Nov. 15, 1915.

The iron trade is in a state of no little perturbation over the prospect that the Steel Works Union may reach an untimely end. At the end of October it was announced that August Thyssen, owner of the Gewerkschaft Deutscher Kaiser and of a great new plant at Hayingen, near Metz, had given notice of withdrawal and a few days later it became known that the Deutsch-Luxemburg and Gelsenkirchen companies had taken similar action. The ordinary time required for giving such notice is six months, but in these cases the denunciations are not to take effect till two months after peace. It is understood that notice was given Oct. 1.

#### DISPUTE OVER HEAVY BEAM ALLOTMENTS

The disagreement is over allotments in heavy broad-flanged beams. Some years ago the Deutsch-Luxemburg Company acquired the American Grey patents for rolling such shapes, and it has enjoyed practically a monopoly in the heavier sections. When, however, the syndicate contract came up for renewal in 1911-12 several other concerns made demands for allotments in such products. For months the struggle among the concerns interested was an obstacle to the renewal. Finally, however, a compromise was agreed to under which the Deutsch-Luxemburg Company received a preferred allotment of 125,000 tons in broad-flanged beams, besides a further allotment of 25 per cent of the remaining consumption, leaving 75 per cent of this remainder to its competitors, consisting of the Burbach-Eich-Duedelingen, Gelsenkirchen, Rombach and Peiner Walzwerk companies. Some of these had not yet begun to roll the sections of beams in question, but were preparing to do so. Peiner did not, in fact, begin to manufacture heavy beams till a comparatively short time ago. When it began turning them out a controversy arose at once between it and the other makers, and the matter had finally to be submitted to arbitration. The judges decided that the Peiner product was not Grey beams. This result, however, did not settle the controversy. The market position, in fact, has been going from bad to worse for this specialty, consumption having now run to less than 30 per cent of allotments. Such a development of the market has of course tended to give Deutsch-Luxemburg a still more predominant position, with its heavy preferred and unvarying allotment, and this has doubtless been the main cause of the discontent that finally led to Thyssen's notice of withdrawal.

The head of the Gelsenkirchen Company is Emil Kirdorf, one of the most prominent men in the German iron and coal trades. He is chairman of the managing board of the Coal Syndicate, besides being on the board of directors of a number of important Rhenish-Westphalian companies. Moreover, his great company is one of the most influential members of the Steel Works Union itself.

What the outcome will be is uncertain. The management of the Union takes the position that the denunciation of the Union contract by the companies named is not legal, and it is given out to the press that the Union proposes to ignore the denunciation altogether. The market has not taken the matter very tragically; "two months after peace" may still be a long way off, and meanwhile, it is believed that a way will be found to adjust differences and keep the Union alive.

#### THE GENERAL SITUATION UNCHANGED

The situation in the iron market has not changed to any great extent since last reported, but the future of some sections of the trade seems to be involved in greater obscurity. A ripple of excitement was caused by the fact that, at the opening of bids for the state railway management at Cologne ten days ago consid-



erably lower prices were bid than those currently reported. In basic steel bars, for example, some bids ran as low as 114 to 125 marks, whereas the general price in the market has hitherto been 140 marks. This latter price, however, had latterly not been maintained, and selling was generally at about 135 marks. One establishment, the Peiner Walzwerk above mentioned, was even reported as offering large shipments of bars at 125 marks, but it has been later asserted that it has again raised its prices. The Cologne incident gave occasion for a meeting of dealers at Dortmund to discuss the situation and decide whether a general reduction of prices should be made. They voted, however, to make no change, as it was claimed that the parties putting in the low bids at Cologne did so without being secured at prices which would warrant their bids, the bidders being dealers, not manufacturers. At the Dortmund conference it was mentioned that all the mills are well provided with orders for bars, and that some of them at least have no interest in taking contracts at less than the convention price.

The pig-iron trade shows a heavy demand for the better qualities, but less interest in the inferior grades. The weakness in scrap continues. In ores there is firmness in Siegerland and Nassau products, but the demand for the minettes of the Lorraine-Luxemburg district has fallen off and shows no indications of improvement. The furnaces are well supplied with Swedish ores, shipments from that country having been practically unhindered by the war. Just now, however, the movement of ores to the furnaces is greatly hampered by the inability of the railroads to cope with the heavy autumn traffic, which includes not only the movement of the crops but also large military requirements. Other sections of the trade show little or no change.

## Metal Market

NEW YORK, Dec. 8, 1915.

### The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin.		Lead—		Spelter—	
Lake	Electro-lytic	New York	New York	New York	St. Louis	New York	St. Louis
Dec. 1.....	20.00	19.75	39.00	5.25	5.17 1/2	18.12 1/2	17.87 1/2
2.....	20.00	19.62 1/2	38.50	5.25	5.17 1/2	17.50	17.25
3.....	19.87 1/2	19.62 1/2	38.50	5.25	5.17 1/2	16.50	16.25
4.....	19.87 1/2	19.62 1/2	38.50	5.25	5.17 1/2	16.00	15.75
5.....	19.87 1/2	19.62 1/2	37.75	5.25	5.17 1/2	15.00	14.75
6.....	19.87 1/2	19.62 1/2	37.75	5.25	5.17 1/2	15.00	14.75
7.....	19.87 1/2	19.62 1/2	37.25	5.25	5.17 1/2	15.00	14.75

Copper is dull and lower. Tin has declined sharply in a stagnant market. Lead is quiet and has an easier tone. Spelter prices dropped rapidly following a complete cessation of buying. Antimony is quiet and lower.

### New York

**Copper.**—The copper market has become extremely quiet, but this surprises no one in view of the very heavy movement of the past two weeks in which many millions of pounds were taken for deliveries ranging from prompt to well into 1916. Some of the producers have unofficially brought their quotation for electrolytic down to 19.75c., cash, New York. A few small resale lots have been offered at 19.50c. Lake is held at about 19.87 1/2c., cash. The London market for electrolytic shows an easier tendency also. The exports this month total 7055 tons.

**Tin.**—Members of the trade say that the market is now paying the penalty of the many false reports which have been circulated of late. Dullness of the most extreme sort has continued. The only trading has been in occasional 5-ton lots, and in the absence of demand prices have sagged heavily. The quotation yesterday was 37.25c. Though there may be an occasional spurt of activity, it is generally expected that the quiet will last beyond the holidays. The steamer Indrawadi, which was due Nov. 20, has finally arrived with 1100 tons, and other arrivals bring those to date this month up to 1805 tons. Some good sized shipments are afloat, and altogether 6753 tons are on the seas.

**Lead.**—While the market has continued dull, the New York quotation has remained at 5.25c. The St. Louis price, however, is off 2 1/2 points, making the Western quotation 5.70 1/2c. The situation is one where producers are well sold up, and consumers have all the metal they need. The lack of ocean freight room and its cost are depressing influences. Some of the railroads have refused to take freight. Another bear influence is the lessening of Russian demand. It is felt that the next move of the market is likely to be a decline. The exports this month total 1202 tons.

**Spelter.**—Since the last report the market has declined over 3c. per lb. and demand has absolutely disappeared. It is said that the cause of this situation is due to consumers' requirements having been filled, in the process of which the producers took on all the business they could handle. On the other hand, it is widely asserted that the recent advance was due more to manipulation than to actual demand, and those who hold this view say there is plenty of spelter to be had. It is certain, however, that some of the producers of high-grade metal are filled with orders for the next three or four months. It is estimated that the brass mills, which ordinarily consume about 80,000 tons a year, are now using spelter at the rate of 200,000 tons per year. Meanwhile the exports continue heavy, those of the first week of December amounting to 2573 tons. Spelter for delivery in the first quarter can now be had at close to 13c. One good effect expected to result from the decline is renewed buying by the galvanizers, most of whom have minimized their requirements. The New York quotation yesterday for prompt delivery was about 15c. and that of St. Louis, 14.75c.

**Antimony.**—Arrivals of the past few days have eased the market considerably, and spot metal (Chinese and Japanese) can be had at 39c. to 39.50c., duty paid.

**Aluminum.**—No. 1 virgin aluminum, 99 per cent pure, is quoted at 58c. to 59c. The sole producer is making no open quotations.

**Old Metals.**—The market shows a tendency to weakness. Dealers' selling prices are nominally unchanged, as follows:

	Cents per lb.
Copper, heavy and crucible.....	18.00 to 18.50
Copper, heavy and wire.....	17.75 to 18.00
Copper, light and bottoms.....	16.00 to 16.50
Brass, heavy.....	12.50 to 13.00
Brass, light.....	11.00 to 11.50
Heavy machine composition.....	15.00 to 15.25
No. 1 yellow rod brass turnings.....	13.00 to 13.50
No. 1 red brass or composition turnings.....	13.00 to 14.00
Lead, heavy.....	4.75
Lead, tea.....	4.50
Zinc.....	11.00 to 12.00

### Chicago

DEC. 7.—The apparent weakness in a number of the metals appears to be occasioned by the operations of the smaller interests, the underlying strength of the situation being well sustained. Spelter presents another erratic break. We quote: Casting copper, 19.25c. to 19.50c.; Lake copper, 19.75c. to 20c.; tin, carloads, 39c.; small lots, 41c.; lead, 5.20c.; spelter, nominally, 15c.; sheet zinc, nominally, 22c.; Cookson's antimony, 50c.; other grades, 42c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 16.25c.; copper bottoms, 15.25c.; copper, clips, 15.50c.; red brass, 13.50c.; yellow brass, 11.50c.; lead pipe, 4.60c.; zinc, 13.75c.; pewter, No 1, 24c.; tinfoil, 30c.; block tin pipe, 32c.

### St. Louis

DEC. 6.—Spelter has dropped sharply, being quoted to-day at 16c., with the tendency still lower. Tin is quoted at 42c.; Lake copper, 20c.; electrolytic copper, 19.75c.; Asiatic antimony, 44c.; lead, 5.40c. In the Joplin ore market, prices fell off about \$10 per ton on zinc blende. The price range, basis of 60 per cent, was \$75 to \$105. Calamine was sold in a range of \$60 to \$70, basis of 40 per cent. Lead brought \$70, basis of 80 per cent. The average prices for the total week's sales were: Zinc blende, \$91.54; calamine, \$64.46; lead, \$68.37. Miscellaneous scrap metals are quoted as follows: Light brass, 7.50c.; heavy yellow brass, 9.50c.; heavy red brass and light copper, 11c.; heavy copper and copper wire, 13c.; zinc, 7.50c.; pewter, 21c.; tinfoil, 30c.; lead, 4c.; tea lead, 3.50c.

## Iron and Industrial Stocks

NEW YORK, Dec. 8, 1915.

Stocks were under pressure on Thursday of the past week when the news became public that the President intended to recommend a tax on pig iron and steel. The situation was further unfavorably influenced by an address by President Frank A. Vanderlip of the National City Bank, in which he cautioned business men not to expect that the belligerents would indefinitely be able to buy supplies in this country even if the war should continue. German and Austrian exchange declined heavily, which was regarded as an indication of weakening of the credit of the Teutonic nations in this country. General business conditions, however, being so buoyantly excellent, speedily offset unfavorable influences and in the following days stocks more than recovered their loss during the period of decline. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com., 30 3/4 - 34 3/4	Sloss, com., 60 - 66 3/4
Allis-Chal., pref., 78 1/2 - 84 1/4	Sloss, pref., 96 - 98 1/2
Am. Can., com., 60 - 62 3/4	Pipe, com., 24 - 26
Am. Can., pref., 109 1/2 - 112 3/4	Pipe, pref., 50 - 51
Am. Car & Fdy., com., 78 1/4 - 82 3/4	U. S. Steel, com., 84 1/4 - 88 1/4
Am. Car & Fdy., pref., 118 - 122	U. S. Steel, pref., 115 3/4 - 116 3/4
Am. Loco., com., 67 1/2 - 72 1/4	Va. I. C. & Coke, 60 - 65
Am. Loco., pref., 102 - 102 3/4	West. Electric, 67 1/2 - 70 1/4
Am. Steel Fdries., 60 1/4 - 64 1/2	Am. Rad., com., 369 - 375
Bald. Loco., com., 109 1/4 - 119 3/4	Am. Rad., pref., 135
Bald. Loco., pref., 111 1/2 - 112	Am. Ship, com., 37 - 38
Beth. Steel, com., 450 - 475	Am. Ship, pref., 80 - 82 1/2
Case (J.I.) pref., 89 - 90	Chic. Pneu. Tool, 79 - 81
Colo. Fuel, 48 1/4 - 53 3/4	Cambria Steel, 72 3/4 - 79 1/4
Dewar & Co., pref., 96 - 96 1/4	Lake Sup. Corp., 9 1/2 - 9 3/4
Gen. Elec., 173 - 178	Pa. Steel, com., 64 - 64 3/4
Gr. No. Ore Cert., 48 - 50 3/4	Pa. Steel, pref., 81 1/4 - 84
Int. Harv. of N. J., com., 108 3/4 - 112 3/4	Warwick, 10 1/4 - 10 1/2
Int. Harv. of N. J., pref., 71 - 80	Cruc. Steel, com., 70 1/4 - 76 1/4
Lackawanna Stl., 80 1/4 - 84 1/2	Cruc. Steel, pref., 110 1/4 - 111 1/2
N. Y. Air Brake, 134 - 142	Harb.-Walk, Refrac., com., 70
Nat. En. & Stm., com., 27 1/4 - 31 1/2	Harb.-Walk, Refrac., pref., 99
Nat. En. & Stm., pref., 94 1/4 - 96	La Belle Iron, com., 49 - 53
Pitts. Steel, pref., 101 1/4 - 102 1/4	La Belle Iron, pref., 123 1/4
Pressed Stl., com., 63 - 66 1/4	Am. Brit. Mfg., com., 15 - 24
Pressed Stl., pref., 105 1/4 - 105 3/4	Am. Brit. Mfg., pref., 75
Ry. Steel Spring, com., 44 1/4 - 46 1/2	Can. Car & Fdy., com., 94 - 99
Ry. Steel Spring, pref., 100 1/4 - 102	Can. Car & Fdy., pref., 110 - 112
Republic, com., 48 1/4 - 55 1/2	Carbon Stl., com., 80 - 85
Republic, pref., 109 3/4 - 110	Dom. Steel, com., 47 1/2 - 47 3/4
Rumely Co., com., 3 - 3 1/4	Driggs-Seabury, 160 - 175
Rumely Co., pref., 7 1/2 - 7 3/4	Midvale Steel, 74 3/4 - 79 1/4

## Dividends

The American Car & Foundry Company, regular quarterly, 1/2 of 1 per cent on the common stock, and 1 3/4 per cent on the preferred stock, payable Jan. 1.

The Union Carbide Company regular quarterly, 2 per cent, payable Jan. 1.

The American Can Company, regular quarterly, 1 3/4 per cent on the preferred stock, payable Jan. 1.

The American Brass Company, extra dividend of 5 per cent, payable Dec. 20. The total dividend disbursements for 1915 will amount to 13 per cent.

The Canadian Locomotive Company, Ltd., regular quarterly, 1 3/4 per cent on the preferred stock, payable Jan. 1.

The Ingersoll-Rand Company, semi-annual, 3 per cent, on the preferred stock, payable Jan. 1.

The Safety Car Heating & Lighting Company, regular quarterly, 2 per cent, payable Dec. 23.

The J. I. Case Threshing Machine Company, regular quarterly, 1 3/4 per cent on the preferred stock, payable Jan. 1.

The Dominion Steel Foundry Company, Hamilton, Ont., regular quarterly, 1 3/4 per cent.

The Allis-Chalmers Mfg. Company, 1 1/2 per cent on the preferred stock for the current quarter and 1 1/2 per cent on accrued dividends, payable Jan. 15. This is the first dividend declaration since the reorganization of the company three years ago. Unpaid dividends now amount to 13 per cent.

The Bethlehem Steel Corporation, regular quarterly, 1 3/4 per cent on the preferred stock, payable Jan. 3.

The La Belle Iron Works, regular quarterly, 1 per cent on the preferred stock, payable Dec. 22.

The Packard Motor Car Company, regular quarterly, 1 3/4 per cent on the preferred stock, payable Dec. 15.

The Continental Can Company, regular quarterly, 1 3/4 per cent on the preferred and 1 1/4 per cent on the common stock, payable Jan. 1.

## Railroad Car Business

The buying of railroad cars continues, about 6000 being placed since the report last week, and at least one unusually large settlement is about to be closed. The total number of cars on which figures have been taken is about 6000, and to this is to be added the 5000 and more cars for which the Illinois Central is expected to be an early purchaser, some 500 cars for the Lehigh Valley, also looked on as an early likelihood; 1000 or more cars for the Missouri, Kansas & Texas, when suitable financial arrangements are made, and the Rutland Railroad is expected to buy before long. The latest inquiries include 550 hopper cars and 200 gondolas for the Lehigh & New England, and 500 dump cars for the United States Department of the Interior.

The Delaware, Lackawanna & Western has closed for 1510 cars, as follows: 1000 box cars to the American Car & Foundry Company, which last week received 500 hopper cars; 200 gondolas to the Standard Steel Car Company and 300 gondola cars to the Barney & Smith Car Company. This railroad also placed ten express cars with the Pullman Company. The Pennsylvania Railroad has placed 1000 gondolas with the Haskell & Barker Car Company; 1150 cars of the same type with the American Car & Foundry Company; 18 passenger equipment cars with the Pullman Company and 32 passenger cars with the Pressed Steel Car Company. The Grand Trunk has arranged with the American Car & Foundry Company for the repairing of 1500 steel cars. The Georgia Southern & Florida has placed 130 gondolas and 373 box cars with the Lenoir Car Works and the New Jersey Zinc Company has divided 20 hopper cars equally between the Pressed Steel Car Company and the Standard Steel Car Company. The Pittsburgh Railway's order appears to cover 190 cars, 100 to the St. Louis Car Company, 75 to the Cincinnati Car Company and 15 to J. G. Brill Company.

## Important Ruling on Scrap Iron

In a case just decided by the Interstate Commerce Commission, that of A. Marx & Sons vs. Illinois Central Railway Company, the commission has laid down a rule for the classification of scrap iron. In three carloads of scrap iron shipped from McComb, Miss., to New Orleans, La., were the remnants of a dismantled sawmill sold to complainants after its owners had removed such portions as they desired to use in the erection of a new mill in another territory, and consisted of loose circular saws, carwheels, shafting and various kindred articles. The shipments were billed as "scrap iron" on which the carload rate from and to the points involved is the class N rate of 9c. When the cars reached New Orleans the inspector of the Southern Weight and Inspection Bureau changed the billing materially, giving the scrap-iron rating to only a portion of the contents of each car and classifying the remainder at various higher rates. The railroad defends the increase on the ground that although the exception sheet to the Southern Classification puts scrap iron (excepting old rails for relaying purposes) in class N, nevertheless a provision of the classification itself specifies that the scrap-iron rate "will apply only on scraps or pieces of old or second-hand iron or steel which cannot be again used for the purposes for which they were intended when new."

The complainants contend that exception sheets take precedence over the classification proper and argue that if the carriers' construction on the tariffs is correct exception sheets would have no function. The commission finds, however, that many items on the exception sheet of the Southern Classification are absolutely meaningless without reference to the classification itself and decides that the two must be read together, and therefore justifies the increased charges made on those parts of the shipment found to be suitable for other use than as scrap iron.

Japan's rail imports declined in 1914 to \$935,555 from \$2,034,993 in 1913.



## Pittsburgh and Nearby Districts

The Standard Tin Plate Company, Canonsburg, Pa., has nearly completed the building of 12 hot tin mills, giving a total of 22, with a capacity of about 1,750,000 base boxes per year. All the new mills will be electrically driven, and as fast as possible the other 10 mills will be changed to be so driven. The impression exists in the trade that the entire output of the company goes to the Continental Can Company. This is incorrect. While a good part of the output is sold to the latter, the Standard company is a seller of bright plate, terne plate and black plate in the open market. With the completion of the new mills it will be a still larger seller. The new mills are being built for the company by the Hyde Park Foundry & Machine Company, Hyde Park, Pa.

The Chicago Pneumatic Tool Company plans to double the capacity of its plant No. 2 at Franklin, Pa., and will probably be in the market for considerable new equipment.

The Crucible Steel Company of America is largely increasing the capacity of the shafting department at its Nimick works, Pittsburgh.

Reports that the Carnegie Steel Company had made definite plans for the building of finishing mills at Girard, Ohio, are incorrect. For some years it has had under consideration the building of mills there for rolling steel bars, hoops, bands and small shapes, the works to be known as the McDonald mills, in honor of Thomas McDonald, general superintendent of the Ohio works of the company at Youngstown. No decision has yet been made and none is likely to be for some time. When the mills are built at Girard the Upper and Lower mills now at Youngstown will probably be removed to the new site, it being the intention of the company to manufacture only the heavier forms of steel at Youngstown.

The Board of Trade of Newton Falls, Ohio, has secured the location of a plant at that place to manufacture water tanks and light structural steel. The new company expects to erect a building 60 x 100 ft. and to employ about fifty men at the start. Newton Falls is located on the Baltimore & Ohio, Pennsylvania and New York Central, while the main line of the Erie passes within three miles. The town has cheap electric power and plenty of water for manufacturing purposes.

The Thomas Carlin's Sons Company, Pittsburgh, reports the following recent orders: Shear for Dominion Iron & Steel Company; grinding pans for H. Koppers Company; shear for American Wire Fence Company; shear for Coatesville Scrap Iron & Steel Company; electric hoist for Hurwitz Brothers; shear for Alexander Hyman; shear for J. T. Knight & Son; grinding pan for Pratt & Letchworth Company; shear for Scranton Bolt & Nut Company; shears for Luria Brothers & Company and shear for P. Pettler & Sons.

The Impervious Sheet Steel Company, Pittsburgh, Pa., of which Charles E. Pope is president, announces that its business has been sold to the Impervious Metal Corporation, incorporated under the laws of the State of New York, with general offices at 421 Wood Street, Pittsburgh. All accounts, contracts and unfilled orders have been assumed by the new corporation and the business will be conducted in the same manner as heretofore and under the same management.

On the evening of Dec. 7, before the Engineers' Society of Western Pennsylvania, in its rooms in the Oliver Building, Pittsburgh, E. C. Brown, chief civil engineer of the Carnegie Steel Company, read a paper on the "Utilization of Iron and Steel Works Slag," illustrated by lantern slides.

The Jones & Laughlin Steel Company, Pittsburgh, is making large additions to the shafting department in its South Side mills and the output will be increased about Jan. 3.

The Public Service Commission of Pennsylvania has directed the Pennsylvania and the Buffalo, Rochester & Pittsburgh railroads to establish joint rates on pig iron from DuBois, Pa., to Huff, Johnstown, Wilmerding and Uniontown, Pa., following a complaint by

the Adrian Furnace Company. The new rates are: To Huff, \$1.20 per ton; to Johnstown and Wilmerding, \$1.25, and to Uniontown, \$1.35.

The Schmidt-McCormick Company, Pittsburgh, with a capital stock of \$5,000, has been incorporated by L. S. Schmidt, Pittsburgh; R. T. McCormick (treasurer), Irwin, Pa., and W. W. Johnston, Pittsburgh, to engage in steel construction work.

The Beaver Steel Company, Pittsburgh, with a capital stock of \$5,000, has been incorporated by Henry F. Gelg, 21 South Diamond Street, Pittsburgh, and Harry E. McWinney, and John W. Smart, Homestead, Pa., to manufacture iron and steel products.

The Pittsburgh Federal Truck Sales Company, Pittsburgh, Pa., with a capital stock of \$25,000, has been incorporated by John W. Lawrence, 1455 North Highland Avenue; D. O. Jones and Leo S. Hartley, to manufacture, deal in and repair motor vehicles.

The McCroskey Reamer Company, Meadville, Pa., has increased its capital stock from \$40,000 to \$120,000.

The General Welding Supplies Company, Erie, Pa., has been incorporated with a capital stock of \$5,000 by Frank J. Tollen, 417 Liberty Street, Erie, and others, to manufacture electrical apparatus and to do electric welding.

The next meeting of the Pittsburgh Foundrymen's Association will be held in the Fort Pitt Hotel on Monday evening, Dec. 20, and will take the form of a social entertainment. The association is making a campaign to secure fifty new members, the object being to make it the largest district foundrymen's association in the country.

J. B. Garden, general manager, Wheeling Electric Company, Wheeling, W. Va., states that the American Gas & Electric Company will build a power plant near Wellsburg to cost about \$2,500,000. It is stated that efforts will be made to locate manufacturing plants near Wellsburg, and sell electric power to them from the new plant.

The Mount Union Refractories Company, Mount Union, Pa., has increased its capital stock from \$300,000 to \$400,000.

At the regular monthly meeting of directors of the Brier Hill Steel Company, Youngstown, Ohio, to be held Dec. 14, it is likely that a decision will be made to appropriate \$1,500,000 or more for the building of by-product coke ovens.

A meeting of stockholders of the New Castle Rubber Company will be held in New Castle, Pa., Dec. 27, to vote on an increase of the capital stock from \$500,000 to \$1,000,000.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, has received a contract from the Duquesne Light Company, Pittsburgh, for two turbo-generators that will develop about 53,000 hp.

In November the Republic Iron & Steel Company, Youngstown, Ohio, made over 100,000 tons of pig iron, about 102,000 tons of steel ingots and about 90,000 tons of finished steel. These are record figures for this company for a month's output.

The Rankin plant of the McClintic-Marshall Company, Pittsburgh, fabricated 1100 tons more steel in November than in any previous month in its history. A dinner to the heads of the various departments of this plant was given by the officials of the company in honor of the record.

In November the Youngstown Sheet & Tube Company shipped over 40,000 tons of iron and steel pipe. It is forwarding large quantities of pipe to England.

The American Steel & Wire Company, Donora, Pa., has started three furnaces of the ten in its new zinc plant. A very fine quality of spelter is being made, the present output being from 25 to 30 tons per day. The company will start the production of sulphuric acid early next week.

The Superior Metal Products Company, Elyria, Ohio, has increased its capital stock from \$50,000 to \$100,000 to take care of its growing business. No plant extensions are contemplated.



## FOREIGN TRADE CONVENTION

Practical Papers and Discussions at New Orleans  
In January

The National Foreign Trade Council, James A. Farrell, chairman, and Robert H. Patchin, secretary, announces the program for the third National Foreign Trade convention, which will be held at the Hotel Grunewald, New Orleans, Jan. 27-29, 1916. In holding this convention the council is working in co-operation with the New Orleans Association of Commerce. The list of papers and of subjects for discussion in group meetings is as follows:

## THURSDAY, JAN. 27

## Morning Session

Convention called to order by Chairman of the Council, James A. Farrell, president United States Steel Corporation. Addresses of welcome by the Governor of Louisiana, Hon. Luther E. Hall, and the Mayor of New Orleans, Hon. Martin Behrman.

Address of welcome on behalf of New Orleans Commercial and Industrial Organizations, L. S. Goldstein.

Address, "World Trade Conditions After the European War," Albin B. Johnson, president Baldwin Locomotive Works, Philadelphia.

Election of President of Convention.

Address, "Foreign Investment of American Capital as an Aid to Our Foreign Trade," James A. Farrell.

Discussion, "Investment in Latin America," Percival Farquhar, president Brazil Railway Company, and E. J. Berwind, president Berwind-White Coal Company, New York.

Address, "Investment in Central America," John Clausen, the Crocker National Bank, San Francisco.

General discussion under ten-minute rule.

## Afternoon Session

Address, "Relation of the Tariff to World Trade Conditions After the War," Willard Straight, New York, president American Asiatic Association.

Discussion.

Address, "Unfair Discrimination Against American Exports," J. J. Culbertson, Paris, Texas, Interstate Cotton Seed Crushers' Association.

Address, "Necessity for an American Dyestuffs Industry to Aid Export Trade in Textiles," Henry Howard, vice-president Merrimac Chemical Company, Boston.

General discussion under ten-minute rule.

## Group Sessions

At 4 p. m., after the general session, the following group sessions will be devoted to detailed discussion of the subjects indicated:

## Group 1

"How to Utilize the Export Commission Houses"

Chairman, W. L. Saunders, chairman Ingersoll-Rand Company, New York.

Discussion: Daniel Warren, American Trading Company, New York; Victor Camors, J. B. Camors & Co., New Orleans, and others.

## Group 2

"Co-operative Foreign Selling"

(Chairman to be announced.)

Discussion by Charles M. Muchnic, vice-president American Locomotive Sales Corporation, New York.

## Evening Session

Address, "Commercial Education for Foreign Trade."

Presentation of report of Committee on Commercial Education for Foreign Trade of the National Foreign Trade Council by W. D. Simmons, president Simmons Hardware Company, St. Louis, chairman.

General discussion.

## FRIDAY, JAN. 28

## Morning Session

Address, "The Merchant Marine." (Speaker to be announced.)

Presentation of report of the Merchant Marine Committee of the National Foreign Trade Council.

Discussion by Capt. Robert Dollar, San Francisco; F. D. Strachan, Brunswick, Ga., and others.

Address, "Co-operative Foreign Selling to Meet World Trade Conditions After the War." (Speaker to be announced.)

Discussion, "Detail of Co-operative Foreign Selling—How Business May Be Fairly Divided—Method of Distribution, etc.," H. C. Lewis, general manager National Paper and Type Company (co-operative).

Discussion, "How the Smaller Manufacturer May More Largely Share the Benefits of Foreign Trade," L. S. Smith, American Laundry Machinery Company, Cincinnati.

## Afternoon Session

(Friday afternoon to be devoted entirely to group sessions.)

## Group 1

"The Smaller Manufacturer in Foreign Trade."

Chairman, H. G. Herget, president Pekin Cooperage Company, Pekin, Ill.

General discussion (five-minute rule).

Leader of discussion, William Pigott, vice-president Seattle Car & Foundry Company, Seattle.

## Group 2

"The Merchant Marine."

Chairman (announced later).

(This session to be devoted to continuation of discussion from the general session.)

## Group 3

"The United States Tariff System and Foreign Trade"

Chairman, D. Y. Cooper, president Henderson Cotton Mills, Henderson, N. C.

## Group 4

"American Banking in Foreign Markets After the War."

Chairman, Sol. Wexler, president Whitney Central National Bank, New Orleans.

## Evening Session

Convention banquet.

Speakers: Frank A. Vanderlip, president National City Bank, of New York; Fairfax Harrison, president Southern Railway Company. Subject, "The Relation of American Railroads to the Development of Foreign Trade."

## SATURDAY, JAN. 29

Reception of reports from group sessions and action thereupon.

Final business of convention.

Inspection of the port improvement works of New Orleans.

As at the St. Louis convention of last January, delegates to New Orleans will pay a registration fee of \$5 for the expenses of the convention and for the official proceedings. Eastern delegates will travel on the Foreign Trade Special leaving New York at 4.35 p.m. Tuesday, Jan. 25, and arriving in New Orleans Thursday morning just before the convention opens.

## Decisions on Virginia Pig-Iron Rates

WASHINGTON, D. C., Dec. 7, 1915.—The Interstate Commerce Commission has rendered a comprehensive decision concerning the freight rates on pig iron from Virginia furnaces to various points in Pennsylvania, New York, Maryland and West Virginia and to Boston by rail-and-water. Tariffs were filed to become effective March 1, 1915, carrying increased rates upon pig iron in carloads from points on the Chesapeake & Ohio Railway and the Norfolk & Western Railway to certain points, the increases being uniformly 5 per cent. The commission finds that the roads have not sustained the burden of proof that the proposed rates to points in Pennsylvania (except Pittsburgh and Pittsburgh rate points), New York and Maryland are just and reasonable and the proposed advances are, therefore, refused.

Concerning the rates from Virginia furnaces to Pittsburgh and Pittsburgh rate points, the defendant railroads showed that their rates to Pittsburgh through their western gateways were increased under the 5 per cent decision. They want a similar increase through their eastern gateways. The present rate to Pittsburgh and Pittsburgh rate points, via eastern gateways, is \$2.90 and the proposed rate is \$3.04, the distance being 433 miles. The commission finds that the railroads are justified in the proposed rate.

Concerning the proposed rates from the furnaces to points in West Virginia, the commission finds from a comparison that they are lower than the maxima prescribed in the Lowmoor case, and, therefore, holds that they are justified. In the matter of the proposed rail-and-water rate from the furnaces to Boston, the commission denied the carriers' request for an advance.

W. L. C.

## BIDS ON STEEL FOR WAR SHIPS

## They Explain in Part High Prices Recently Named by Shipyards

WASHINGTON, D. C., Dec. 7, 1915.—Bids opened by the Navy Department on the 3rd inst. for 68,422,220 lb., or 27,600 gross tons, of steel plates, shapes, rivets, etc., for use in the construction of battleships Nos. 43 and 44, should it be decided to build them in Government yards, go far toward justifying the high bids of the private shipyards on these two vessels, which Secretary Daniels has so sharply criticised. The proposals for steel show that only one concern, the Carnegie Steel Company, is in position to bid on a large part of the department's requirements and that, taking the lowest bids throughout, the total cost of the material will be \$1,245,837 per vessel, an increase of \$251,737, or 25 per cent, over the cost of corresponding material contracted for Feb. 16, 1915, for the battleship California, the last of this class to be constructed in a Government yard.

The conditions accompanying the bids for the steel for the two battleships also reflect the present abnormal situation in the industry. The specifications call for complete deliveries to be made within 24 months and for deliveries of any specified quantity within 90 days after the receipt of schedules, but the principal bidders stipulated that while they would agree to complete deliveries within the two-year limit, they would not bind themselves to fill schedules under less than four months, although they would make every effort to do so within the 90-day limit. It is clear from the prices and conditions of the bids that the private shipyards, which recently submitted figures for these battleships, have barely protected themselves, and it will be interesting to know whether, under the circumstances, the Secretary of the Navy will adhere to his announced intention of building these vessels in Government yards.

## CARNEGIE STEEL COMPANY BIDS LOW

The Carnegie Steel Company makes an almost clean sweep of the contracts for medium class steel plates, angles, beams, channels, etc., on the basis of the lowest bids, and is also the successful bidder for special treatment steel plates. The Carbon Steel Company is the lowest bidder on nickel steel plates; the American Steel Foundries of Chester, Pa., submitted the low price for steel castings, while the Pittsburgh Screw & Bolt Company and H. A. Wagner of Lebanon, Pa., were lowest on certain specified lots of rivets. The details of the bids follow:

Class 1, 8,385,700 lb. of special treatment steel plates: Carbon Steel Company, Pittsburgh, Pa., 8.96c. per lb.; Carnegie Steel Company, Pittsburgh, Pa., 8.16c. per lb.

Class 2, 1,557,800 lb. of special treatment steel plates of various gages and shapes: Carnegie Steel Company, 8.16c. to 11.25c. per lb.

Class 3, 2,600,000 lb. medium class steel plates, 10 lb. per sq. ft.: Carbon Steel Company, 2c.; Carnegie Steel Company, 1.725c.; Worth Brothers, Coatesville, Pa., 1.9c.

Class 4, 18,900,000 lb. steel plates, 10 to 70 lb. per sq. ft.: Carbon Steel Company, 2c.; Carnegie Steel Company, 1.625c.; Worth Brothers, 1.9c.

Class 5, 600,000 lb. steel plates, 10 lb. per sq. ft.: Carbon Steel Company, 2.1c.; Carnegie Steel Company, 1.825c.; Worth Brothers, 2c.

Class 6, 4,780,000 lb. steel plates, 10 to 70 lb. per sq. ft.: Carbon Steel Company, 2.1c.; Carnegie Steel Company, 1.725c.; Worth Brothers, 2c.

Class 7, 900,000 lb. steel plates, 7 to 10 lb. per sq. ft.: Carnegie Steel Company, 1.79c.; Worth Brothers, 2c. and 2.1c., according to specifications.

Class 8, 340,000 lb. steel plates, 5 lb. per sq. ft.: Carnegie Steel Company, 2.025c.; Worth Brothers, 2.2c.

Class 9, 9,611,720 lb. nickel steel plates, 25 to 70 lb. per sq. ft.: Carbon Steel Company, 5.59c.; Carnegie Steel Company, 6.75c.; Worth Brothers, 6c. and 6.1c.

Class 10, 1,600,000 lb. high tensile steel plates, 12 to 60 lb. per sq. ft.: Carnegie Steel Company, 2.63c.; Worth Brothers, 2.8c. and 2.9c.

Upon classes 11 to 20 inclusive, the Carnegie Steel Company was the only bidder, as follows:

Class 11, 22,400 lb. high tensile steel angles, 2 1/2 in. x 3 1/2 in. x 13.8 lb. per sq. ft.: 3.225c.  
Class 12, 112,000 lb. steel, class A, checkered plates, 8.87 to 13.8 lb. per sq. ft.: 3.225c.  
Class 13, 1,748,000 lb. steel angles up to 3 in. on either flange and up to 66 ft. in length, 1.725c.  
Class 14, 6,048,000 lb. steel angles from 3 1/2 to 6 in. on either flange and up to 66 ft. in length, 1.625c.  
Class 15, 403,200 lb. steel angles, 6 to 8-in. flanges and up to 66 ft. in length, 1.725c.  
Class 16, 200,000 lb. steel beams, 4 to 12-in. web and up to 40 ft. in length, 1.625c.  
Class 17, 3,000,000 lb. steel ship channels, 4 to 12-in. web and up to 60 ft. in length, 1.79c.  
Class 18, 67,200 lb. steel half-rounds both solid and hollow, 5.225c.  
Class 19, 448,000 lb. steel flat bars, various dimensions, 1.725c.  
Class 20, 180,000 lb. steel shapes, various sections and weights, 1.625c.  
Class 21, lot rivets, Pittsburgh Screw & Bolt Company, 2.65c. to 6.5c. per lb.; H. A. Wagner, Lebanon, Pa., 2.8c. to 6.55c.  
Class 22, lot rivets, Pittsburgh Screw & Bolt Company, 11.5c.; H. A. Wagner, 11.125c.  
Class 23, steel castings, American Steel Foundries, Chester, Pa., 6c. to 6.5c.; Baldt Steel Company, Newcastle, Del., 6.6c.; Bethlehem Steel Company, 8.25c. to 8.75c.; Eagan-Rogers Steel & Iron Company, Crumlynn, Pa., 6.5c.; Pennsylvania Steel Castings & Machine Company, Chester, Pa., 7.5c.

W. L. C.

## New Labor Troubles in New England

On Nov. 29 about 86 toolmakers walked out of the plant of the Winchester Repeating Arms Company, New Haven, Conn., demanding an 8-hr. day with 10-hr. pay. Other departments have been slightly affected, but the officials of the company state that some of the strikers are returning to work, and that there is no indication that the trouble will become general.

A meeting was held Sunday, Dec. 5, in Bridgeport by machinists of the Union Metallic Cartridge Company, at which a committee was appointed to confer with officials of the company concerning alleged grievances, the principal one appearing to be that certain foremen are alleged to have discriminated against some of the leaders of the local labor organizations. Several of the national officers of the Machinists' Union were in the city and were expected to hold a meeting to consider the situations at the Remington and Winchester plants.

About 60 or 70 machinists walked out of the plant of the Knox Motors Company, Springfield, Mass., Dec. 6, as a result of the company's refusal to recognize a union committee or to make certain adjustments in overtime pay. The trouble will probably not spread to the other men, as there appears to be little sympathy with the demands presented.

There is little change in the situation in the other places where strikes are on.

## General Refractories Buys Silica Brick Plant

The Mount Union Silica Brick Company, Mount Union, Pa., has been sold to the General Refractories Company, 903 Trinity Building, New York, of which William C. Sproul, Chester, Pa., is president. It was the largest independent manufacturer of silica bricks and shapes in the country and was owned by the estate of Scott Dibert, Johnstown, Pa.

The company owns, in addition to extensive works at Mount Union, a tract of 3200 acres of ganister, from which silica refractories are made. The boom in the steel trade and by-product coke-oven business has made a great demand for silica bricks. The price paid for the works was about \$600,000.

The Mansfield Sheet & Tin Plate Company, Mansfield, Ohio, will increase its capacity about one-third as a result of action recently taken by the board of directors. The improvements will include four cold mills and one hot mill, electrically driven, additional annealing furnaces and more cranes. An extension to the plant will be built, 140 x 240 ft.

# Machinery Markets and News of the Works

## MORE LARGE WAR ORDERS

### Terms of Payment Revised by Sellers

#### Domestic Users Place Orders in Good Volume Specifying Best Deliveries Possible—Scarcity of Raw Materials Is Serious

As shown by the following instances, orders for large groups of machine tools required to fill war orders are still being placed, though included in the purchases are single-purpose machines which, now or later, will not conflict with business in standard machines. A Dayton, Ohio, shell-maker placed an order for about 50 machines in Cleveland last week, and an effort was made in that city to place an order for 50,000 to 200,000 75-mm. shells, said to be for Holland. An Eastern munitions maker is reported to have purchased machinery valued at \$1,000,000 in Cincinnati in the past few weeks, and in the same city a large Russian order was placed. The East End Iron & Machine Company is reported to have sold a large quantity of cartridge-making machinery to the Kathodion Bronze Works, Nyack, N. Y. The Harrisburg Foundry & Machine Company, Harrisburg, Pa., purchased 65 lathes from a Cleveland house.

Machine-tool builders and dealers, as indicated in the New York market, have in various ways revised their contracts with regard to prices, all with a view of guarding themselves against losses which, without care, might be entailed by the steadily rising market for raw materials. The heaviest foreign buyers now active in New York are Russians, or their representatives.

The Bethlehem Steel Company will duplicate its machine shop which was destroyed by fire recently, and the tool builders have agreed to help the company out to the best of their ability. The Pool Engineering & Machine Company, Woodberry, Md., which has large war orders, has been reincorporated with a capital stock of \$3,000,000.

Throughout the country, except in the extreme West, the domestic demand for machinery is good, and orders are being placed subject to the best delivery that can be made. Automobile makers continue to buy in Detroit for delivery throughout Michigan. Inquiry for shell-making lathes has fallen off in Cleveland, although the demand is still good. The Canton Drop Forge & Mfg. Company, Canton, Ohio, is adding to its plant a machine shop for light machine work, and has recently installed other equipment. Users of forgings are finding difficulty in getting deliveries because of the crowded condition of forge shops.

Milwaukee notes the menace to the machinery industry in the growing scarcity of raw materials. The labor trouble in Madison, Wis., has been settled. The Thomas D. Jeffrey Company, Kenosha, Wis., is adding extensively to its plant. The labor situation at Cincinnati is now about normal, although conditions at Hamilton show little improvement.

Demand continues to exceed the supply in Chicago,

even second-hand machines of an inferior grade being well-nigh exhausted. Among many other items, Chicago notes that the Illinois Central Railroad will spend at least \$200,000 in improving its shops at Freeport, Ill., in the spring.

New labor troubles are threatening in Bridgeport, Conn., also at New Haven. In other New England cities where strikes are in progress no change is reported.

In Canada the Imperial Munitions Board has been formed to replace the former shell committee. British representatives are working on a plan to increase Canada's output of shells.

## New York

NEW YORK, Dec. 8, 1915.

Widely varying methods are now used by machine-tool builders with regard to the prices of their products. Some have withdrawn prices entirely, although they are taking business for forward deliveries with the stipulation that purchasers must pay the prices prevailing at the time of delivery. Others accept orders at quoted prices, but with the understanding that they may advance the prices named in contracts by giving notice three months in advance of delivery, taking the ground that for three months in advance they will know what their raw materials are going to cost. Where notices of such advances are given, however, the customer has the option of cancelling his order. The purpose of all this procedure is to eliminate risk to the manufacturer. One tool builder has taken the stand that all makers of war munitions should be in a position to definitely charge the cost of machines to his war contracts, and to do so at the time he enters a contract. He therefore names a fixed price for his tools, but one which has been substantially advanced, a course which he has found acceptable to his customers. A maker of milling machines first withdrew prices, then fixed them for deliveries up to next August, after which month the prevailing price is to rule.

The heaviest foreign buyers are now the Russians, of whom there are a number in the city. They do not demur at the strict terms of payment which are asked, usually a certain amount of cash with the order and the balance on the presentation of inland shipping documents.

France, which has declared an embargo against the exportation of machine tools, recently took possession of some American machines which were in transit to Switzerland. An inventory of all the machine tools in France has been taken, including those in dealers' stocks. All shipments from Great Britain, even those destined for her continental allies, can be made only subject to the approval of the Government.

The demand for tools shows no indication of abating and orders are being freely placed by industrial companies despite the terms of payment already referred to. The call from the automobile and allied trades continues heavy.

Immediately following the fire which destroyed one of the large shops of the Bethlehem Steel Company, South Bethlehem, Pa., steps were taken for the duplication of all the machinery which had been ruined. All of the tool builders agreed to do their utmost to have tools ready for shipment by the time the new building is completed.

Hoisting machinery business is still very active, and is confined for the most part to domestic business, chiefly from steel plant expansion and shipbuilding activities. Probably three or four times the normal amount of business has been coming from steel plants within the last few months. Competition continues to be keen. Practically none of the business is coming from the railroads.

The Driver-Harris Wire Company, Harrison, N. J., is erecting a brick and steel addition to its present plant, 50 x 150 ft., to cost about \$25,000. It will be devoted to heavy wire drawing. This will take care of its increased business in nickel and nickel alloy wires, which were formerly marketed in great quantity here by European manufacturers. Arlington Bensei is vice-president.

It is reported that the East End Iron & Machine Com-



pany, Lima, Ohio, has sold the Kathodion Bronze Works \$1,500,000 worth of cartridge-making machinery. It is said that shipments are to begin immediately to the Kathodion plant at Nyack, N. Y.

The Davis-Bournonville Company, Marion Station, Jersey City, N. J., manufacturer of oxy-acetylene welding and cutting apparatus, has awarded contract to John N. Gill & Co., 1215 Filbert Street, Jersey City, for the construction of a three-story reinforced concrete building, 70 x 200 ft., to cost about \$70,000. It is to be erected adjoining its present plant to provide additional facilities for the manufacture of its products and will be completed this winter. The company doubled its machine-shop floor space less than six months ago.

The J. J. O'Leary Company, 500 Bloomfield Avenue, Passaic, N. J., has received the general contract to erect four factory buildings at Athenia, N. J., for the Athenia Steel Company, 135 William Street, New York City. F. H. Quinby, 99 Nassau Street, New York City, is the architect.

The Mulliner Machine Tool Company, Syracuse, N. Y., has been incorporated with a capitalization of \$25,000 to manufacture machinery, tools and patented appliances. The incorporators are R. H. and G. W. Mulliner and J. A. Tolishus.

The Hoevel Mfg. Corporation, Hörnell, N. Y., has been incorporated to manufacture sand blast machines, foundry equipment, etc., and will establish a plant. The incorporators are F. Waldemar Weiss, 96 Clove Road, New Rochelle; H. Lawson and H. G. Wenzel, Jr., 46 Cedar Street, New York City.

A brick and steel boilerhouse to cost \$15,000 is to be built at the Atlas Works of the Standard Oil Company, Elk Street and the Buffalo Creek Terminal Railroad, Buffalo.

The Empire Metal Products Corporation, 60 Broadway, New York, is reported to have purchased the factory at Irvington-on-Hudson, N. Y., built for the publishing of the Cosmopolitan Magazine. It was held for sale at \$100,000.

It was announced Dec. 3 that the Arlington Company, Arlington, N. J., manufacturer of pyralin, a cellulose product, had been purchased by the E. I. du Pont de Nemours Powder Company, Wilmington, Del. The purchase price was between \$6,000,000 and \$7,000,000. About 3000 hands are employed at the plant.

## Philadelphia

PHILADELPHIA, PA., Dec. 6, 1915.

It is estimated that over \$2,000,000 has been invested here in the last ten weeks by the French, British and Russian governments and by manufacturers of munitions in Canada for machinery. Probably 75 per cent of the machinery purchased here is for export account.

New machinery is purchased where used tools would do because the market is being cleared of the latter.

Twenty-four used machinery dealers in Philadelphia have been getting the benefit of the boom. One dealer is quoted as saying that his business is six times greater than it was and that the improvement will continue for some time.

The plant of the Everly & Orris Mfg. Company, Mechanicsburg, Pa., is to be put on full time to take care of increased orders.

To enlarge the plant's facilities the Keystone Leather Company, Camden, N. J., has purchased an acre of ground on the north side of Federal Street west of Seventeenth Street from the Samuel H. French Estate.

The shipyard of the Chester Shipbuilding Company, Chester, Pa., will be equipped with four ways, one of which is about completed. A machine shop and office building are nearly finished and two smaller buildings are going up. The company will employ about 1000 men within the next few weeks, and when the other ways are completed this number will be increased to 1500.

With considerable machinery already installed and workmen adding the finishing touches to the Eddystone Munition Company's plant, it will be but a few weeks before it is in operation. Some of the machinery has already been in operation on test pieces it is reported. The report that the company had bought four square miles of land near Lakehurst, N. J., from the Manchester Land Company, is without foundation. It has been leased by the munition company for a proving ground.

The Atlantic Refining Company, 3144 Passyunk Avenue, Philadelphia, has taken out a permit for a three-story concrete and stone factory, 145 x 147 ft., to cost about \$40,000.

A permit has been granted to the Baldwin Locomotive Works, Philadelphia, for a temporary one-story brick addition to its machine shop at Twenty-sixth Street and Pennsylvania Avenue, 30 x 100 ft., to be erected at a cost of about \$3,000.

W. E. S. Dyer, Land Title Building, Philadelphia, has drawn plans for a machine shop addition to the plant of Baxter, Kelly & Faust, manufacturing plumbers, on Arbo Street near Tioga, at a cost of about \$1,000. It will be 22 x 26 ft., one story.

Part of a building in which two blowing engines are housed at the Pennsylvania Steel Company's plant at Steelton, Pa., was burned Nov. 29. The engines were not damaged.

The Charles E. Bard Company, Harrisburg, Pa., with a capital stock of \$5,000 has been incorporated by C. E. and M. E. Bard, Paxtang, Pa., and Theodore Kharas, Harrisburg, Pa., to manufacture piano player actions. Work on a factory at Paxtang has already been started.

## New England

BOSTON, MASS., Dec. 6, 1915.

It is reported that the Maxim Munitions Company, New Haven, Conn., is to build immediately a building adjoining the Fuller plant, which it recently purchased. The main building is to be 50 x 300 ft., with ells 50 x 100 ft. and 50 x 80 ft., all two stories. The report adds that it will have equipment costing \$370,000 and will be used for the manufacture of brass shells for ammunition. No explosives will be handled in connection with this contract which is stated to be for more than 20,000,000 shells. The present building will be used for the manufacture of tripod-mounted machine guns.

The Abbott & Downing Company, Concord, N. H., is reported about to give up the manufacture of horse-drawn vehicles. It will enter the motor field, manufacturing commercial trucks, building its own chassis and purchasing the motors.

The Potter & Johnson Machine Company, Pawtucket, R. I., has bought the plant of the Brown Cotton Gin Company, New London, Conn., according to an announcement from the latter city.

The Broad Gauge Iron Works, 77 Portland Street, Boston, Mass., has awarded a contract for a building, 60 x 150 ft., one story, to be erected in Everett, Mass.

The Standard Rotary Valve Company, Pittsfield, Mass., has been formed with an authorized capital of \$50,000. Joseph H. D. Beaucage is president, Earle C. Jacobs is treasurer and Stanley Smith is the other director.

The reported purchase of a factory site in Plainville, Conn., by Albert F. Rockwell of the Bristol Brass Company has revived the rumor that he will again engage in the manufacture of ball bearings. Mr. Rockwell was until recently the president of the New Departure Mfg. Company, Bristol, Conn.

The new grinding building of the New Departure Mfg. Company, Bristol, Conn., a building with 32,000 sq. ft. of floor space, was formally dedicated Dec. 3 by an entertainment and bazar under the auspices of the fire department of the company. The new building of the Geometric Tool Company, New Haven, is also to be dedicated by an entertainment Dec. 9.

The American Brass Company has bought a 12-acre tract on the west bank of the Housatonic River at Stratford, Conn. This makes its holdings at this point 25 acres, which it is understood will be used as a coal terminal for its various plants in the Naugatuck Valley.

The Fuller Mfg. Company, which recently sold its plant in New Haven, Conn., to the Maxim Munitions Company, has opened a temporary office in that city at Room 720, Second National Bank Building.

The rumor that the American Tube & Stamping Company, Bridgeport, Conn., has been sold to the Schwab interests has brought forth a denial by Charles G. Sanford, vice-president and treasurer of the company.

The stockholders of the Sharp Mfg. Company, New Bedford, Mass., textiles, will be asked Dec. 14, to vote an increase of \$700,000 in the capital of the company, making a total of \$2,500,000. The new capital will be used to double the size of the present plant.

A. Hankey & Co., Inc., Leicester, Mass., machinist and tool maker, has been incorporated with an authorized capital of \$50,000. Albert A. Richards is president and treasurer.

The Clawfoot Company, Springfield, Mass., has been organized with a capital of \$50,000 to manufacture machinery and supplies for horses' overshoes. The incorporators are M. S. Chapin, president; Causten Browne, treasurer, and W. M. Wharfield.

The C. H. Cowdrey Machine Company, Fitchburg, Mass., is to build an addition, 54 x 84 ft., two stories.

The Bay State Pump Company, Boston, Mass., has been incorporated with authorized capital of \$30,000 by A. L. Nickerson, president, William W. Clarke, treasurer, and W. R. Dorr.

The Fibroid Company, Indian Orchard, Mass., has awarded a contract for the erection of three buildings; 37 x 63 ft., four stories, 28 x 28 ft., one story, and 35 x 47 ft., one story.

The Ajax Metal Hoop Corporation, Boston, Mass., has filed a certificate of incorporation with authorized capital of \$100,000. The incorporators are A. Melendez, president; Walter T. Belcher, treasurer, and I. S. Elliott.

The Davitt Foundry Company, Springfield, Mass., is to build an addition to its foundry.

The New England Steel & Machinery Company has been incorporated at Boston, Mass., with authorized capital of \$100,000 by H. Douglas Campbell and others.

## Baltimore

BALTIMORE, Md., Dec. 6, 1915.

The Poole Engineering & Machine Company, Woodberry, Md., has been incorporated at Dover, Del., with \$3,000,000 of capital stock and \$500,000 of bonds. It succeeds the present company, which is filling munitions orders and rapidly completing a testing ground at Texas, Md. The incorporators are S. Proctor Brady, Germon H. H. Emory, Eli Frank and J. H. Wheeler, Jr.

A new boilerhouse and screening shed will be built at Port Covington, Baltimore, by the Western Maryland Railway Company.

Application has been made by Fleet Brothers to use the property 817 Plum Alley, Baltimore, as a wood-working plant and to install motors.

It is understood that the Paper Products Company, Fifteenth Street, Highlandtown, Md., intends manufacturing munitions of war. Its plant for the manufacture of paper products was recently completed. Frank W. Waterman is manager.

The Crown Cork & Seal Company, Guilford Avenue, Baltimore, continues to acquire property near its plant, but no announcement as to its use has been made.

An additional story will be constructed to the present quarters of the Mergenthaler Company, machinist, 116-118 Hollingsworth Street, Baltimore.

The United Railways & Electric Company, Baltimore, will equip its shops for the purpose of vestibuling all its cars and equipping them with automatic wheelguards.

The Womble Machine Company, Cheriton, Va., has been incorporated with \$50,000 capital stock. S. W. Womble is president.

The Non-Collapsible Tube Corporation, Richmond, Va., has been incorporated with \$50,000 capital stock. M. E. Marcuse is secretary.

Machinery to be used for stone cutting will be installed by the Brush Millstone Company, Blacksburg, Va.

## Chicago

CHICAGO, ILL., Dec. 6, 1915.

Inquiry in this market exceeds in its requirements the daily resources of machinery dealers by a considerable margin. For the most part purchasers are filling in with a tool here and there, derived from whatever sources may happen to have machines that can be made available. The movement of second-hand machinery continues heavy. The entire district has been scoured for available used machinery and dealers are buying up equipment for overhauling and resale, the condition of which would have barred it from all consideration at other times. Even for such tools there appears to be a ready market. The deliveries obtainable on new machine purchases do not seem to be improving. February and March will probably make available a considerable number of lathes which have been ordered for resale but on the other hand dealers are now ordering some tools for stock for August delivery. The Great Northern Railway list, the details of which have already been published, because of its miscellaneous character can be filled in all probability with fair promptness, but it fails to command the interest which ordinarily attaches to railroad inquiry of this size.

The Marquette Cement Mfg. Company, Chicago, has let contracts for considerable new equipment for its plant, including furnaces, grinding machinery and generators.

The Illinois Malleable Iron Company, Chicago, has under construction, in connection with its gray iron foundry, a new shop, 46 x 108 ft., to contain 6 ovens, and is also clearing ground for a 150-ft. extension to the foundry, which will provide a gray iron foundry covering an area of 80 x 500 ft. These additions are necessitated by the pressing demands upon the company, whose malleable plant is also working to full capacity and is melting daily the largest tonnage in its history. This firm is not handling war business, its output being purely for domestic consumption.

The National Ox-Hydric Company, 105 West Monroe Street, Chicago, has taken the contracts for supplying one of its electrolytic oxygen and hydrogen producing plants in each of the following works: Michigan Steel Casting Company, Detroit; Detroit Pressed Steel Company, Detroit; Fore River Shipbuilding Corporation, Quincy, Mass.

The G. A. Ball Bearing Mfg. Company has become established at 123-141 North Albany Street, Chicago, having secured a plant affording double the manufacturing capacity formerly occupied. The company is working on a 24-hr. schedule and has ample business to engage it for several months.

The Bates Machine Company, Joliet, Ill., will build additions to its plant which will call for an expenditure of \$100,000. The plans call for extensions to the foundry and machine shops. With the increase in its foundry the company plans to triple its capacity.

The Illinois Central Railroad will spend at least \$200,000 in improvements at its shops at Freeport, Ill., in the spring.

Robert Holmes & Bros. have purchased the plant of the Danville Foundry & Machine Company, Danville, Ill., and will remove their present machine shops and boiler plant as soon as alterations and extensions can be made to the buildings.

The Geneva Foundry & Machine Company, Geneva, Ill., has awarded contract to C. J. Eckman for an addition, to cost about \$5,000.

S. A. Ingersol, president of the Coulter-Disc Company, Galesburg, Ill., which plant was recently destroyed by fire with a loss of \$100,000, has announced that new buildings will be erected as soon as plans can be completed.

The Aetna Explosives Company has announced that it will start work at once on the first of a series of buildings for a new plant at Fayville, Ill. This is to be an acid plant building, of brick and concrete construction, to cost \$25,000, and is to be equipped with the latest facilities and machinery.

The new unit to be added to the plant of the Lennox Furnace Company, Marshalltown, Iowa, is to be a foundry. It will be erected in the spring. The company is not yet ready to consider any new equipment.

The Perkins Mfg. Company, Des Moines, Iowa, has been formed by Harry M. Strong, Vernon R. Seeburger and LeRoy Perkins. It has a capital of \$10,000 and will manufacture machinery, auto accessories and mechanical devices.

The Twin City Four Wheel Drive Company, St. Paul, Minn., has let the contract to the National Material & Supply Company, Minneapolis, for its new motor truck plant to cost \$51,000.

Harris Brothers, Chicago, have purchased the plant of the Charles A. Stickney Company, St. Paul, Minn., maker of gasoline engines and tractors.

Work has been started on a new 100 x 150 ft. factory in North St. Paul for the Minnesota Manufacturers' Association which will cost \$20,000.

## Indianapolis

INDIANAPOLIS, IND., Dec. 6, 1915.

The Welch Mfg. Company, Indianapolis, has been incorporated with \$50,000 capital stock to manufacture electrical appliances. The directors are J. H. Welch, J. L. Jasper and L. S. MacEnamey.

The Lentz-Schebler Company, Indianapolis, has been incorporated with \$12,000 capital stock to manufacture automobile parts. The directors are W. G. Schebler, G. W. and M. Allen Lentz.

The Parry Mfg. Company, Indianapolis, has announced that its preferred stock of \$700,000 has been redeemed.

The Peerless Specialty & Mfg. Company, Knox, Ind., has been incorporated with \$5,000 capital stock to manufacture automobile parts, accessories, etc. The directors are Frank C. H. Strasburg, Adeline G. Strasburg and A. P. Kiest.

The Miller-Lillich Mfg. Company, Ft. Wayne, Ind., has been incorporated with \$100,000 capital stock to manufacture an anti-skidding device for automobiles. The directors are Thomas O. Nelson, Emmet G. Reed, William N. Ballou, William H. Lillich and Harry Miller.

The Simmons Mfg. Company, Huntington, Ind., has been incorporated with \$6,000 capital stock to manufacture novelties. The directors are H. M. I. Buckles, P. R. Simmons and E. M. Simmons.

The Cincinnati, Indianapolis & Western Railroad will spend more than \$2,000,000 for equipment and repairs according to President B. A. Worthington. It is to take over the local division of the Cincinnati, Hamilton & Dayton Railroad. About \$3,500,000 in bonds has been issued by the new

company. The proposed new equipment includes 8 Mikado, 10 consolidation freight, 8 switch, 6 large passenger, 5 small passenger and 10 local freight engines; 50 stock cars, 200 gondolas, 50 hopper cars, 80 flat cars, 350 box cars, 20 cabooses, 3 steel postal cars, 9 steel baggage cars, 15 steel coaches, 1 wrecking crane, etc.

The Ft. Wayne Concrete Tile Company, Ft. Wayne, Ind., has been incorporated with \$25,000 capital stock to manufacture concrete shingles and blocks. The directors are Robert Milliard, Edmund A. Bittler and W. E. Woebeking.

The Leo Rumely Tractor Company, La Porte, Ind., has been incorporated with \$30,000 capital stock to make tractors, plows, motor cars, etc. The directors are Leo M. Rumely, Peter N. Wolf, James L. Phee, Lee L. Osborn and A. J. Rumely.

The Elkhart Carriage & Harness Mfg. Company, Elkhart, Ind., has changed its name to the Elkhart Carriage & Motor Car Company.

The Kokomo Steel & Wire Company, Kokomo, Ind., has announced that it will erect a building for additional open-hearth furnaces in the spring, which will give the mill fifty per cent larger capacity.

Due to the heavy increase in its business, it has become necessary for the T. W. Warner Company, maker of automobile parts, Muncie, Ind., to erect two additional buildings; one of brick and steel, and the other all steel. Before the present additions are completed it will spend approximately \$100,000. The contract for steel has been placed with the Indiana Bridge Company. A great part of material and equipment has already been purchased. It plans to have the building completed by Jan. 1. W. M. Sample is manager.

## Cleveland

CLEVELAND, OHIO, Dec. 6, 1915.

A heavy demand exists for machine tools from plants that are adding to their equipment and orders are being placed for the best deliveries that can be secured. Some plants are sold up for nearly a year. Inquiries for lathes for shell work have fallen off, although the demand is still good. Among the sales made during the week by a Cleveland machinery house was fifty-five lathes to the Harrisburg Foundry & Machine Company, Harrisburg, Pa. A maker of shell parts at Dayton, Ohio, placed an order with a Cleveland dealer for about fifty additional machines. An Eastern buyer was in the city the past week trying to place several shell orders, including 50,000 to 200,000 75-mm. shells for Holland. Few manufacturers in this territory, however, are in a position to take additional work without enlarging their facilities. Punching and shearing machinery are in good demand. Forge shops are crowded with work and users of forgings are having difficulty getting deliveries wanted.

The Cleveland Steel Barrel Company, Cleveland, will erect a two-story concrete addition to its plant at 9612 Meetch Avenue.

The Steel Products Company, Cleveland, will erect a concrete machine shop and office building, to cost \$40,000, it will be of irregular shape, 96 x 56 x 127 ft.

The Cleveland Steel Valve Company, Cleveland, has been incorporated with a capital stock of \$25,000 by Harvey B. Redding, William A. Thomas, C. W. Sapp, and others.

The Elyria Iron & Steel Company, Cleveland, has commenced the erection of a brick and steel addition, 70 x 119 ft., to be used for storage purposes.

The Canton Drop Forge & Mfg. Company, Canton, Ohio, is making an extension to its plant and adding new equipment. The machine shop is being enlarged by the erection of a second story, 55 x 60 ft., to be used for light machine work. A 300-kw. mixed pressure General Electric turbine and a 500-hp. Sterling boiler equipped with Westinghouse forced draft stoker have been installed, and all the boilers will be equipped with a Greene ash handling system. The contract has been placed with the Brown Hoisting Machinery Company for a complete monorail system. Three new steam hammers, 3000, 4000 and 5000 lb., respectively, have been added, and orders have been placed for three additional ones. The hammer equipment is being furnished by the Alliance Machine Company, Alliance, Ohio.

The Wadsworth Aluminum Company, Wadsworth, Ohio, has been incorporated with a capital stock of \$20,000 to manufacture aluminum. W. C. Hackburn, H. W. Hackman, and others, are the incorporators.

The Firestone Tire & Rubber Company, Akron, Ohio, has taken out permits for four buildings, two five-story and two single-story buildings.

The Fiber Pail & Package Company, Toledo, Ohio, has taken over the plant formerly occupied by the Lawrence Stamping Company, a new firm, of which J. J. La Salle is president and C. R. Smith, manager.

The Acklin Stamping Company, Toledo, Ohio, is having plans prepared for a three-story addition, 50 x 50 ft.

The Toledo Machine & Tool Company, Toledo, Ohio, about Jan. 1, will occupy its new plant, 100 x 400 ft., two stories, now being erected.

## Cincinnati

CINCINNATI, OHIO, Dec. 6, 1915.

Steady gains were made last week by local plants in the number of men employed, so that, with the exception of a few firms, the situation is about normal. In Hamilton, Ohio, conditions continue unsatisfactory, due to the hostile attitude of municipal officials. The majority of the striking workmen would gladly return to work if efficient police protection was afforded them. A change in city officials, however, is scheduled for Jan. 1, when conditions will doubtless improve rapidly. Neither Dayton, Springfield nor Columbus, Ohio, reports any serious trouble.

An Eastern company, having a large ware munitions contract, is known to have placed orders in the past six weeks for nearly \$1,000,000 worth of machinery, much of which was given to Cincinnati machine-tool makers. An official of the company is authority for the statement that lathe builders are unduly alarmed in anticipating ruinous competition from second-hand machine-tool dealers after the war, for the reason that so many lathes now being bought are single-purpose machines and not adaptable for regular machine shop work. A local firm last week received a large order from Russia for machine tools, and this particular market is being closely watched. It is the opinion of well-informed manufacturers that it will prove a profitable field to exploit when peace is declared and more direct communications are established.

The St. Bernard Acid Works, St. Bernard, Cincinnati, a new company headed by Gustave Jarecki, will build a plant in St. Bernard suburb. Nothing is known as to equipment needs.

The John Douglas Company, Cincinnati, maker of sanitary equipment, has purchased an 11-acre site in Millicreek Valley suburb, on which it will erect a central factory building to house its different manufacturing plants, one of which is located in the East.

The Metal Stamping & Mfg. Company, Cincinnati, has been incorporated with \$10,000 capital stock. Plans have not yet been announced, but details may be obtained later from George F. Dittman, 233 Senator Place, Cincinnati.

The addition to the plant of the Modern Foundry Company, Oakley, Cincinnati, has been completed and the necessary equipment is being installed.

The American Rolling Mill Company, Middletown, Ohio, is building an addition to its East Side plant, 50 x 150 ft. of steel construction.

The Concrete Steel Construction Company, Dayton, Ohio, has been incorporated with \$5,000 capital stock to do general construction work. George L. Ohmart is one of the incorporators.

It is reported, but not confirmed, that plans are under way for lifting the receivership under which the Barney Smith Car Company, Dayton, Ohio, has been operating for some time. It has lately added a great deal of equipment to its plant.

The Apple Auto Top Company, Dayton, Ohio, has plans prepared for a brick building, 100 x 150 ft., four stories to take the place of its factory recently destroyed by fire.

The Greater Dayton Association, Dayton, Ohio, announces that over 75 spaces have been reserved for the Industrial Exposition to be held in that city Jan. 14 to 23, next.

The Webster Brick Company, South Webster, Ohio, has increased its capital stock from \$100,000 to \$200,000, and will make some factory extensions.

The Springfield Metallic Casket Company, Springfield, Ohio, has awarded contract for an addition to its plant at cost \$3,000.

The Guldán Violin Company, Columbus, Ohio, has been formed to establish a factory for the manufacture of violins. It will occupy a building at Main and Canal streets.

The Union Oil Cloth Company, Columbus, Ohio, has contract for a factory to be constructed at the corner of Spruce Street and Dennison Avenue.

The Chesapeake & Ohio Railroad Company has let contract for a brick addition to its repair shops at Russell, Ky., to be 40 x 85 ft.

In addition to boilerhouse extensions planned by the A. & W. Wiborg Company, Cincinnati, three separate structures will be built, the main building being of brick, 80 x 120 ft., one story. The company expects to enter the manufacture of dyes; but no information is now available as to the necessary equipment.



## Milwaukee

MILWAUKEE, Wis., Dec. 6, 1915.

A serious menace to the metal-working trades is the increasing shortage of raw materials, especially the greatly restricted supply of high-speed steels. The main issue now is to get materials at any price. Up to this time tool builders have been able to maintain their overtime schedules, but the prospects are that before the end of December it will be necessary to abandon night forces to bring production within the bounds limited by supplies of raw materials. One large gasoline motor manufacturer has already found this necessary. In the face of this situation the demand for tools shows no slackening, inasmuch as purchasers who have no relation to war material production are now in the market.

The labor trouble at the Steidle plant in Madison has been overcome and production there has been back at its former high level since Dec. 1. The strikers accepted the offer of an 8-hr. day and 10-hr. pay after April 1. The new Ford plant in Milwaukee will start work Jan. 15 and announced Dec. 1 that no further applications for employment can be considered. Three thousand applications for 400 positions were received.

The Green Bay Barker Company, Green Bay, Wis., manufacturing knife barkers and other paper and pulp mill equipment, is arranging to increase its output and is having plans drawn by Foeller & Schober, architects, Green Bay, for a shop addition to cost about \$10,000.

The Foster Construction Company, Milwaukee, has been awarded the general contract for the erection of a box and package factory for the Nufer-Cedar Company, Whitehall, Mich., to cost \$30,000. It will be of brick and steel, 70 x 100 ft., one story, with an annex, 30 x 100 ft., and a boilerhouse and engine room, 25 x 30 ft. The steel work has been sublet to the C. Hennecke Company, Milwaukee.

The contract for ore chutes for docks Nos. 1 and 2 of the Chicago & Northwestern Railway at Ashland, Wis., has been awarded to the Wisconsin Bridge & Iron Company, Milwaukee.

J. C. Wright, Antigo, Wis., has purchased the property of the defunct International Hoist Company, Antigo, at foreclosure sale for \$13,500. The works have been operating under the direction of the receiver, F. A. Hecker, and Mr. Wright intends to continue it as a going concern.

The Milwaukee common council has appropriated \$15,000 for a new powerhouse at the Blue Mound Sanatorium for Tuberculosis, Wauwatosa, Wis. Plans are being prepared by the department of public works, Fred G. Simmons, commissioner. Work will start in the spring.

Articles of incorporation have been filed in behalf of the A. L. Baer Pipe Company, Milwaukee. The capital stock is \$5,000 and the incorporators are A. L. Baer, John Falbe and N. Forster.

The Jaeschke Brothers Foundry Company, 3026 Locust Street, Milwaukee, has broken ground for a plant at Cawker Place and the Chicago, Milwaukee & St. Paul Railroad tracks, to cost about \$20,000. It will consist of two buildings, a foundry and a pattern shop and a storage house, including the offices.

Emil Janke, Tomah, Wis., will erect a concrete and tile building, 50 x 150 ft., one and two stories. Practically a new equipment of machinery is required.

John B. Drahonovsky, president and manager of the J. B. D. Resilient Wheel Company, 671 Smith Street, Milwaukee, has organized the J. B. D. Carburetor Company, with \$10,000 capital, to manufacture automobile and gasoline engine appliances. Operations will be carried on in connection with the steel wheel works. E. F. and D. E. Deuster are associated in the carburetor firm.

The Southern Wisconsin Electric Company, Lake Geneva, Wis., has been incorporated with \$100,000 capital by John B. Sanborn, C. E. Blake and J. P. Alberg.

The Thomas B. Jeffrey Company, Kenosha, Wis., will build two more factory buildings to accommodate its foreign truck orders, both three stories. The Jeffrey company is employing approximately 2500 workmen, compared with 1300 a year ago. Its previous maximum working force was 2100.

The Butternut Electric Light & Power Company, Butternut, Wis., has been incorporated with \$5,000 capital stock by W. J. Shulz, H. F. Seiwert and E. M. Shulz.

The recently created Board of Administration of Charitable and Penal Institutions of Milwaukee County is preparing to establish a central electric light, heat and power plant to serve seven large institutions in the town of Wauwatosa. A survey shows the estimated cost of the central plant to be \$355,000. Louis G. Widule is county clerk.

The Myers Machine Company, Sheboygan, Wis., recently incorporated, is about to make an addition, 75 ft. square, two and three stories and basement, to accommodate its motor

truck production. The company specializes in wood-working machinery and will continue this line. It has elected the following officers: President, George P. Myers; vice-president, Louis P. Helm; secretary, E. R. Bowler; treasurer, Joseph G. Myers. It is purchasing equipment. Louis P. Helm is manager of the motor truck department.

The first unit of the new tire and rubber plant to be established at Eau Claire, Wis., by the Gillette Safety Tire Company, Grand Rapids, Mich., will be a fireproof building, 60 x 250 ft., one and two stories, to be erected this winter. The output will be 150 tires daily and the working force will number 100. Power will be purchased from the Wisconsin-Minnesota Light & Power Company.

The Stamping & Tool Company, LaCrosse, Wis., has declined a large contract for work on war munitions for the Allies in order to accommodate its own business, which has been greatly increased in the last six months. Several other LaCrosse manufacturers in the metal-working trades have also declined to entertain similar propositions.

The Kleinstaub Combination Post Company, Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture fixtures for outdoor illumination and for carrying wires. The incorporators are Oscar Kleinstaub, Robert Barth and J. F. Parnkopf, Jr.

The Schlesinger interests of Milwaukee, owning and operating the Milwaukee Solvay Coke Company, in addition to extensive iron-ore, blast furnace and allied industries, are about to make an investment of \$100,000 at Milwaukee for the purpose of manufacturing coal tar products, notably dyestuffs. A plant will be erected at once near Carrollville, on Lake Michigan, to be ready by March 15. The raw supplies will be furnished partly by the Schlesinger interests and partly by companies not in a position to utilize suitable by-products themselves. The plant will make what is known as intermediates, or chemicals used in the manufacture of dyestuffs, but will manufacture no colors. It is also stated that the American Tar Products Company, Chicago, has purchased acreage adjoining the Schlesinger holdings near Carrollville and proposes to erect a plant for the refinement of coal tar and the manufacture of roofing materials. E. G. Wilmer is in charge of the Schlesinger project at this point.

The French Battery & Carbon Company, Madison, Wis., suffered the total destruction of its plant by fire on Dec. 1, the loss being estimated at \$100,000. Officials of the company are convinced that the fire was not of incendiary origin, as widely reported, but was due to crossed wires. The company had been operating night and day for several months to fill orders for batteries, fuses, etc., principally for automobile manufacturers. It is considered certain that the plant will be rebuilt immediately. J. B. Ramsey is president.

## Detroit

DETROIT, MICH., Dec. 6, 1915.

The demand for machine tools continues active and the volume of business transacted during the past month is perhaps greater than for any similar period in the present year. Quiet buying is going on by automobile manufacturers. The upstate manufacturing centers are absorbing considerable equipment, the market being especially active at Jackson, Lansing and Muskegon. Manufacturers in all metal-working lines are rushed with orders and numerous plant extensions are either in course of construction or being planned. The labor situation has quieted down and no further trouble is anticipated at present.

The Springfield Body Company, Springfield, Mass., incorporated with \$1,000,000 capital stock, is arranging for the construction of an automobile body plant at Detroit. The officers include W. L. Fry, New York; E. W. McGookin, Detroit, and A. P. Smith, Springfield.

The Daly-Mohr Company, Detroit, has been incorporated with \$5,000 capital stock to manufacture automobile parts. Arthur Daly and Max Mohr are the principal stockholders.

Parker, Webb & Co., Detroit, are enlarging their packing plant by the erection of an addition, 100 x 100 ft. Refrigerating machinery and other equipment will be installed.

The G. & C. Electric Mfg. Company, Detroit, has been incorporated with \$25,000 capital stock to manufacture electric appliances. The incorporators are Charles L. Cox, Ralph L. and A. R. Gilpin.

The Consolidated Car Company, Detroit, manufacturer of automobiles, has increased its capital stock from \$200,000 to \$500,000.

The Morton Salt Company, Port Huron, Mich., is enlarging its plant by the erection of an addition on a site recently acquired.

The Challenge Refrigerator Company, Grand Haven, Mich., is planning the erection of an addition to its plant, 130 x 175 ft., two stories.

The Dake Engine Company, Grand Haven, Mich., has awarded the contract for an addition to its plant, 50 x 60 ft.

The Gile Boat & Engine Company, Ludington, Mich., has begun the erection of an addition, 40 x 150 ft., to be used principally as an assembling room.

The Seager Engine Works and the Reliance Engineering Company, both of Lansing, Mich., have merged under the title of the latter company, and will manufacture automobile parts and specialties. The officers are Charles P. Downey, Edmond C. Shields and J. H. Wilford.

The Automatic Products Company, Detroit, Mich., has moved to 24 Dubois Street and the floor space it occupied has been taken by the Murchey Machine & Tool Company, located on an adjoining floor in the same building, enabling the latter company to increase its capacity.

The Hahn Machine & Specialty Company, Detroit, Mich., has increased its capital stock from \$5,000 to \$10,000.

The Welded Steel Barrel Company, Detroit, Mich., has let contract for a two-story, reinforced concrete factory to be built at Hart and Charlevoix avenues.

The Kalamazoo Match Plate & Foundry Company, Kalamazoo, Mich., has been organized with a capital of \$3,500.

The American Steam Pipe Company, Battle Creek, Mich., will build an addition to its plant, 52 x 103 ft.

The Homer Furnace Company, Homer, Mich., will build a foundry addition.

The Buick Motor Company, Flint, Mich., is having plans made for a gray iron foundry, 240 x 270 ft., two stories, to be built of reinforced concrete and steel, which will have a capacity of 200 tons or more of metal per 10 hr. It is in the market for foundry equipment, particularly monorails, hoists and cranes.

## The Central South

LOUISVILLE, KY., Dec. 6, 1915.

Full-time operations are the rule with local machinery plants, which have not been operating on this basis for over a year. Another evidence of increased business is that stocks of machinery have been cleaned out and factories are now promising deliveries only sixty and ninety days hence. The demand for machine tools continues heavy, and orders from abroad are figuring in the situation to a marked extent. The demand for boilers is good, and some large jobs are under way. Generators are selling well, but motors are not so active.

Armour & Co., Chicago, are reported to have plans for the establishment of wood extract plants in eastern Kentucky for producing tannic acid, etc.

The planing-mill of the Fooks Lumber Company, Paducah, Ky., recently destroyed by fire with a loss of \$7,500, will be replaced.

The Kentucky River Power Company, Hazard, Ky., has increased its capitalization from \$150,000 to \$200,000 and has under construction a steam power plant at Glowmawr for supplying electric power to coal mines in that section.

The Vest Excelsior Company, Ooltewah, Tenn., is in the market for equipment for making excelsior. J. C. Vest is buying.

G. L. Aronhime, Bristol, Tenn., is equipping an abattoir and packing house. Refrigerating and other machinery will be needed.

The Lookout Paint Mfg. Company, Chattanooga, Tenn., is in the market for a jaw or gyratory crusher for handling paint material. Address C. B. Samuel.

The Clarksville Buggy Company, Clarksville, Tenn., is planning to enlarge its facilities and will erect another building.

W. C. and J. Moores, Fayetteville, Tenn., will establish a vehicle factory, for which equipment is being purchased.

The Witt Lumber Company, Knoxville, Tenn., recently organized with \$15,000 capital stock, has begun the construction of a planing-mill and is in the market for machinery. Electric motors will be used.

The Columbia Ice & Cold Storage Company, Columbia, Tenn., will build an addition to its plant and install additional refrigerating equipment.

The Carolina, Greeneville & Northern Railway has announced plans for the construction of a traction line from Bristol to Knoxville, Tenn., and will let contracts for the first section at once. Leroy Parks, Bristol, is agent.

The Hamilton Motor Car Company, Chattanooga, Tenn., will build a garage to cost \$20,000, for which equipment will be needed.

The Walsh & Weidner Boiler Company, Chattanooga, Tenn., has added structural steel manufacturing to its business, which heretofore has been restricted to boilers and tank work.

The Peerless Block Colliery Coal Company, Hazard, Ky., is being organized with a capital stock of \$100,000 and will put in a large mining plant. L. Wood Jones is president and Jarvis Collins, general manager.

## Birmingham

BIRMINGHAM, ALA., Dec. 6, 1915.

Machinery dealers report a recovery from the lull which marked the middle of November. Wood-working establishments are busy and buying tools, engines and boilers. Electrical apparatus for mining purposes is also active. A fair business is being done all around and the outlook improves.

The City Commissioners, Mobile, Ala., have engaged Ford, Bacon & Davis, New Orleans, La., as engineers for the construction of docks, terminals, etc.

The Magnolia Compress & Warehouse Company, Mobile, Ala., has plans for the construction of a system of elevated railways between its cotton warehouses and the water front, with electrically driven lifts, tractors, etc.

The Anniston Ordnance Company, Anniston, Ala., successor to the Southern Munitions Corporation, has been incorporated with a capital stock of \$500,000.

The Polar Ice & Coal Company, Anniston, Ala., will build an addition to its plant at a cost of \$10,000.

## St. Louis

ST. LOUIS, MO., Dec. 6, 1915.

Increasing disposition to finance new enterprises is increasing the pressure on the machine-tool market, although less difficulty is met in supplying a considerable part of these needs than in the case of the extension of existing industries which require apparatus of special type for the manufacturing of munitions. Most of the time of dealers is now being spent in hunting for tools no longer in use which can be used or made over. Second-hand tools are almost as hard to get as new machinery, and command almost equally good prices because of their immediate availability. Sales are made without even removing the tools from their former location, passing directly to the buyer without even being moved to the dealer's establishment. Investment money is becoming rapidly more plentiful.

The Cutler-Schneider Machine Company, St. Louis, Mo., has been incorporated with a capital stock of \$12,500 by James H. Cutler, Charles C. Schneider and Ida Hackmeier to manufacture specialty machinery.

The Bartholomew Mfg. & Supply Company, St. Louis, Mo., has been incorporated with a capital stock of \$15,000 by E. C. and E. L. Bartholomew and Edward Newman to manufacture motors and motor car accessories.

The Booth Fisheries Company, Chicago, Ill., has acquired a building in St. Louis which it plans to equip as a refrigerating plant and distribution branch.

The St. Louis Enameled Range Company, St. Louis, Mo., has been incorporated with a capital stock of \$12,000 by F. E. Bryan, W. L. Culver and William A. Koerner.

The Interlocking Rail & Structural Steel Company, 523 Boatmen's Bank Building, St. Louis, Mo., has been incorporated with a capital stock of \$100,000 by Fred Hyke, F. W. Eckstein, and others.

The Pierce Oil Corporation of St. Louis, Mo., will equip a branch station at Hannibal, Mo., with pumps, etc.

The Adair County Light, Power & Ice Company, Kirksville, Mo., has been incorporated with a capital stock of \$100,000 by Harry M. Still, John C. Mills and Charles V. Miller, and will equip an electric light and power plant.

The R. W. Yates Laundry Machinery & Supply Company, Kansas City, Mo., has been incorporated by Richard W. Yates, Harr T. Mayes, and others.

The Bunting Hardware Company, Kansas City, Mo., has been incorporated with a capital stock of \$100,000 by George H. Bunting, F. D. Whiting and M. H. Winger to manufacture hardware, etc.

The J. V. Boland Construction Company, St. Louis, Mo., is reported in the market for power plant equipment.

The Booneville Light & Power Company, Booneville, Ark., has been incorporated with a capital stock of \$50,000 by C. S. Greenway, Robt. Harvey and R. M. Harvey.

The Jonesboro Ice Company, Jonesboro, Ark., has plans for a cold-storage plant 23 x 110 ft., two stories, which will be equipped at once. T. E. Mitchell is the engineer in charge.

The Fort Smith Wagon Company, Fort Smith, Ark., will increase its factory capacity and is reported in the market for the additional equipment.

A box factory will be equipped at Higginson, Ark., by W. C. Racey, W. B. Potts and A. W. Vincent.

The Bodcaw Lumber Company, Stamps, Ark., will re-equip that portion of its plant recently burned with a loss of about \$200,000.

Plants for the manufacture of ice and cottonseed oil products will be equipped at McAlester, Okla., by A. C. Murray, Clarksville, Tenn., and others.

The Wenslay Pump Company, Enid, Okla., has been incorporated with a capital stock of \$25,000 by J. G. Cook, Billings, Okla.; Ole Wenslay, Enid, Okla., and Clarence M. Cook, Garber, Okla., to manufacture pumps.

The Gannill Lumber Company, Pelahatchee, Miss., will equip a mill near Jackson, Miss., to work up 54,000 acres of timber.

The Tennessee & Mississippi Mfg. Company, Columbus, Miss., will equip a woodworking plant for the manufacture of washtubs, etc. James A. Fuson is president.

The Hinton Mfg. Company, McComb, Miss., has been incorporated with a capital stock of \$10,000 by J. H., E. R. and H. E. Hinton to manufacture boxes.

Crawford, Jenkins & Booth, Shreveport, La., are reported in the market for cold-storage and ice-making machinery.

W. K. Henderson, Jr., Shreveport, La., plans to increase the capacity of his machine shop.

## Texas

AUSTIN, TEX., Dec. 6, 1915.

The machinery and tool business is keeping pace with the State's industrial growth and dealers are optimistic. Money from the cotton, grain and other crops is now in general circulation and much of it is going into industrial enterprises.

The City Commission of Fort Worth has rejected all bids for the erection of a municipal garage and repair shop.

The Houston, Richmond & San Antonio Interurban Railway Company, Bedell Building, San Antonio, is making progress with its plans for the construction of a hydroelectric plant on the Guadalupe River, near Seguin. Contracts will be awarded within sixty days. Ed. Kennedy is president.

It is announced by J. F. Strickland, Dallas, president of the Southern Traction Company, that steps will be taken for extending its railway from Waco to San Antonio, a distance of about 180 miles.

The Lockhart Oil Mill Company, Lockhart, will rebuild its cottonseed-oil mill recently destroyed by fire. The new plant will cost about \$50,000.

The Roswell Gas & Electric Company, Roswell, N. M., will install a steam turbine and make other improvements to its plant at a cost of about \$20,000.

The Pampa Water, Light & Power Company, Pampa, has been organized for the purpose of building a water and light plant. A. E. Davis is in charge.

The Sautena Company, Rio Bravo, Tamaulipas, Mexico, is arranging to resume construction of its system of irrigation and pumping plant, the original unit of which will water about 30,000 acres. Plans call for additional units to total 100,000 acres. F. H. Carson, San Antonio, Texas, is chief engineer.

The Magnolia Paper Company, Houston, Tex., will start work soon on the erection of a warehouse and factory at a total cost of about \$100,000.

## San Francisco

SAN FRANCISCO, Nov. 30, 1915.

A rapid increase of strength in the general machinery trade is expected early next year. The mining situation continues especially favorable, the late advance in silver having renewed activity. The outlook is bright for irrigation equipment, and many inquiries are appearing for canning machinery. A few good-sized sales of machine tools are being closed, and merchants find it hard to keep any diversity of stock on hand, though most buyers are now disposed to fill up orders.

Practically all the important shipbuilding contracts placed here thus far have gone to the Union Iron Works. This interest has closed new contracts for the construction of three oil tankers, two for the Atlantic & Gulf Refining Company and one for a London company, at an aggregate cost of about \$2,850,000.

Henry R. Worthington, Inc., which has had an establishment on First Street near Mission for several years, has leased a two-story building to be erected on Townsend Street between Fifth and Sixth.

The Herman Safe Company has leased a new building on Fremont Street near Howard for the manufacture of safes and metal furniture.

The California & Hawaiian Sugar Company will build a warehouse at Martinez, Cal., which will be equipped with conveyors, etc., for handling sugar.

It is reported that the American Potash Company, Long Beach, Cal., will greatly enlarge its plant for the manufacture of kelp products.

The Yuba Consolidated Goldfields, operating above Marysville, Cal., is starting work on a new gold dredge, and it is reported that the Marysville Gold Dredging Company will also build one.

F. S. Luce has bought out the Orange County Machine Shop, Anaheim, Cal.

The Monarch Foundry, Stockton, Cal., will install a steel furnace at its plant at a cost of \$25,000.

## The Pacific Northwest

SEATTLE, WASH., Nov. 30, 1915.

Mining machinery business remains unusually active, inquiries and orders coming from all parts of Montana, Oregon, Washington and Alaska. Shipbuilding plants report active winter season, with a number of ships in drydock for overhauling and repairs.

Machinery men expect to profit by the shutdown of the lumber mills, as many of the plants will be now overhauled and put in condition for the spring season.

The E. H. Stanton Company, Spokane, Wash., will construct a five-story addition, 100 x 150, to its packing plant at a cost of about \$100,000.

The Wright Truck Attachment Company, Seattle, Wash., has been incorporated with a capital stock of \$50,000 by W. W. Wright and R. W. Scott.

The Kalispell Iron Works, Kalispell, Mont., will add a repair shop to its plant.

Thomas Denny, Wiatburg, Ore., plans to establish a machine and repair shop at Enterprise, Ore.

The power plant of the C. K. Mining Company, Dawson, Y. T., Canada, was recently destroyed by fire. It was located on the mouth of Bear Creek, a short distance north of Dawson. Unofficial figures place the loss at \$250,000.

It is announced that construction work will start immediately on the Fales Houston Packing Company's packing and cold-storage plant, to be erected at Pocatello, Idaho. C. E. Bennett, Denver, is general manager.

## Canada

TORONTO, Dec. 6, 1915.

A plan is being worked out to greatly increase the capacity of Canadian factories for producing projectiles. Messrs. Hichens and Brand, representatives of the British Government in Canada, are at work on the details of the plan. The purpose of the reorganization is to provide for filling war orders on a larger scale in the most expeditious and economical manner possible.

The Imperial Munitions Board, J. W. Flavell, chairman, has been formed to replace the former shell committee. The new board will inquire into the supply and sufficiency of raw materials in Canada for the manufacture of shells, guns, etc., and the best method of conserving them. Slightly over \$300,000,000 worth of shell orders have been placed in Canada so far by the shell or munitions committees, according to an official statement.

Canadian steel manufacturers are all working at high pressure and have business on hand to insure capacity operations until well on into next spring. The bulk of orders are connected with munitions contracts. Purely domestic business is still quiet and promises to remain so, owing to the high scale of prices now quoted.



The Steel Company of Canada, Hamilton, Ont., as a result of its increasing business and the prospect for future business, is planning extensive additions to its plant. Three open-hearth furnaces are to be built at once, the blooming mill extended and two forge shops erected for the manufacture of 8 and 9.2-in. shells. Several hundred thousand dollars will be spent. Robert Hobson is general manager.

It is reported that Sir Herbert Holt, Montreal, and others will take over the Transcona Shops at Winnipeg, Man., for the manufacture of munitions.

The Tallman Brass Company, Wilson Street, Hamilton, Ont., is building an addition.

The Rideau Power Company is building a power plant at Merrickville, Ont., to cost \$80,000.

The Chapman Double Ball Bearing Company of Canada, 347 Sorauren Avenue, Toronto, is building an addition to cost \$6,000. J. F. Strickland, 23 Saunders Avenue, is superintendent of construction.

The Dominion Bridge Company, Lachine, Que., is building a steel addition to its girder shop at Lachine Locks, to cost \$22,000.

The International Safe & Register Company, Fort Erie, Ont., will build an addition.

George Wright, Comber, Ont., is in the market for brick and tile making machinery.

The Canada Hardwood Mfg. Company, Ltd., Deseronto, Ont., is in the market for sawmill and wood-working machinery, automatic lathes, belting, etc. G. A. Turner is buyer.

Ottawa, Ont., contemplates the purchase of a traveller, cable, boilers, etc. F. C. Askwith is the engineer.

C. Richardson & Co., Wellington Street, St. Mary's, Ont., is in the market for shell-making machinery.

G. W. Farrell & Co., Edmonton, Alberta, has signed a contract to supply power to the city. It will build a power plant and an electric railway to cost \$6,000,000.

The Dominion Steel Foundry Company, Ltd., Hamilton, Ont., is adding four buildings to its plant. It has received orders for munitions.

The Acme Stamping Tool Works, Hamilton, Ont., will build an addition to its plant to cost \$3,000.

The Canada Forge Company, Welland, Ont., will build a steel addition 80 x 180 ft. to its plant at a cost of \$20,000. The equipment to cost \$100,000 will be installed in it. T. J. Dillon is manager.

The Gasoline Engine & Supply Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$5,000 by W. F. Ronadbush, C. Sargent, E. P. Hayden and others to manufacture engines, machinery, etc.

The factory of the Gold Medal Furniture Mfg. Company, Van Horne Street, Toronto, was destroyed by fire Dec. 3 with a loss of \$100,000. W. J. McMurty is manager.

The Governor Fastener Company of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by Samuel W. Jacobs, Alexander R. Hall, Harry Gough and others to manufacture hooks, fasteners, belts, etc.

C. B. Dayfoot & Co., Georgetown, Ont., is in the market for a 35 to 50-hp. boiler.

The Battle Creek Toasted Corn Flake Company, Ltd., Dundas Street, London, Ont., will install electrical equipment to operate its machinery.

## Government Purchases

WASHINGTON, D. C., Dec. 6, 1915.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until (date not set), for one 72-in. stroke, electrically-driven planing machine for Washington.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, Nov. 30, for supplies for the navy yards as follows:

### Schedule 8976, Ordnance

Class 111, Washington—One universal milling machine—Manning, Maxwell & Moore, \$1,440; Swind Machinery Company, \$1,626.

Class 112, Washington—Two motor-driven combined vertical and horizontal spindle milling machines—no bids.

### Schedule 8989, Ordnance

Class 181, Washington—Two cone-drive lathes—Kemp Machinery Company, \$610; Sherritt & Stoer Company, \$865.

### Schedule 8990, Steam Engineering

Class 191, Philadelphia—Two boring bars—Manning, Maxwell & Moore, \$1,062; Sherritt & Stoer Company, \$1,300.

## NEW TRADE PUBLICATIONS

**Emery Wheel Truing Tools.**—Arthur A. Crafts, 123 Summer Street, Boston, Mass. Booklet. Illustrates a variety of diamond and carbon pointed tools for truing emery wheels. There is practically no text in the booklet, the various engravings being relied upon to tell the story. Mention is also made of a line of glaziers' diamonds and opticians', core and lip drills.

**Power Pumps.**—Scranton Pump Company, Scranton, Pa. Bulletin No. 104. Refers to a line of triplex power pumps of the plunger or piston type, receiving their power from electric motors, gas and oil engines or other prime movers through gearing or a belt connection. The advantages of this type of pump are briefly touched upon, special emphasis being laid upon the uniformity of the combined discharge from the cylinders due to the use of three cranks. The construction of the pumps is gone into at some length, and special emphasis is laid upon the use of electric power for driving them.

**Motor-Driven Fans.**—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Bulletin No. 221. Describes the smaller sizes and types of a line of motor-driven fans which are built in the centrifugal, propeller and disk styles. The uses of the various kinds of fans are briefly discussed, followed by descriptions of the different fans with illustrations and specifications.

**Tackle Blocks.**—Western Block Company, Lockport, N. Y. Catalog No. 15. Describes almost entirely by illustrations a line of wood, wrought iron and steel blocks for various purposes. All of the different styles of block are shown and tables of the sizes in which they can be furnished are included.

**Screw Cutting Tools and Machinery.**—Wells Brothers Company Division, Greenfield Tap & Die Corporation, Greenfield, Mass. Catalog No. 34 and pamphlet. The former gives general description and specifications for a line of screw cutting tools and machinery that includes dies, screw plates, pipe stocks and dies, taps and reamers and threading machines for bolts, nuts and pipe with automatic opening and solid heads equipped for hand or power operation. The catalog is divided into sections which deal with some one line of tools and machinery and for the most part a separate page is given to each style with a brief description, illustration and table of sizes made. A glossary of terms and a number of tables of useful information are included. The pamphlet relates to a self-opening die that is made in three styles, all of which are illustrated and briefly described.

**Shell Banding Press.**—Motch & Merryweather Machinery Company, Cleveland, Ohio. Circular. Describes briefly a pneumatic banding press for compressing the copper band on shrapnel shells. An illustration of the machine is given, together with a brief statement of the production that can be secured, and a condensed table of specifications is included. An illustrated description of the press appeared in THE IRON AGE, June 24, 1915.

**Table Sand-Blast Machine.**—Pangborn Corporation, Hagerstown, Md. Bulletin No. 531. Presents a brief description with illustration of a table sand-blast machine for handling medium and small castings. The use of this apparatus in which the castings are laid on the table and are cleaned by rotating nozzles passing over the entire table surface at a slight angle is mentioned. The provisions that are made for removing the refuse from the sand and exhausting the dust-laden air are touched upon.

**Hydraulic Machinery.**—Allis-Chalmers Mfg. Company, Milwaukee, Wis. Bulletin No. 1635. Gives an idea of the range of manufacture covered by the company's hydraulic turbines and accessories with a view to enabling the purchaser to obtain a general idea of the apparatus available to meet his requirements. The illustrations, which cover both horizontal and vertical shaft units, are both half-tones and line engravings to show the apparatus and the way in which it is installed and the amount of space required. The points to be considered in the selection of the correct type of unit are briefly touched upon and mention is made of the work that has been done in the reconstruction of old plants and the installation of impulse wheel units.

**Combination Protractor.**—3-in-1 Mfg. Company, Hartford, Conn. Folder. Presents a brief description with illustration of a combination drafting instrument consisting of a steel protractor with adjustable transparent blades. The combination of angles that can be secured by the use of the instrument, which was illustrated in THE IRON AGE, June 9, 1915, is shown and instructions for its use are given.

to  
a  
n  
er  
of  
w  
l-  
r-  
n-  
as  
no  
nd  
in  
ed.  
in-  
ty  
nd  
en,  
can  
in-  
in  
on,  
de-  
ine  
this  
and  
ble  
cha  
ex  
any  
the  
unil  
pur  
able  
over  
the  
y is  
The  
pe o  
the  
last  
Har  
h a  
stio  
To  
of the  
be 2